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# Journal

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## Royal Army Medical Corps.

### Original Communications.

#### FURTHER RESULTS OF THE EXPERIMENTAL TREATMENT OF TRYPANOSOMIASIS ; BEING A PROGRESS REPORT TO A COMMITTEE OF THE ROYAL SOCIETY.<sup>1</sup>

BY H. G. PLIMMER, F.L.S., AND CAPTAIN W. B. FRY,  
*Royal Army Medical Corps.*

THE following results are a continuation of the work of which summaries have already appeared in the *Proceedings of the Royal Society*.<sup>2</sup>

These experiments have been carried out, with the same strain of Surra as was used before, at the Brown Institution and the Lister Institute.

#### A.—CONDITION OF THE ANIMALS LIVING AT THE DATE OF THE COMPLETION OF THE TABLES IN THE LAST PAPER.

*Rats treated with Sodium Antimonyl Tartrate, 1 per cent. (p. 478).*

No. 7 died 428 days after inoculation.

,, 32 „ 409 „ „

,, 35 „ 371 „ „

*Rats treated with Sodium Antimonyl Tartrate, 5 per cent., in Colonel Lambkin's Medium (p. 482).*

No. 13 died 216 days after inoculation.

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<sup>1</sup> Reprinted from the *Proceedings of the Royal Society*, B, vol. lxxxi.

<sup>2</sup> B, vol. lxxix., 1907, pp. 500-516 ; B, vol. lxxx., 1908, pp. 1-12 and 477-487.

*Experimental Treatment of Trypanosomiasis*

*Rats treated with Antimony (metal), 5 per cent., in Colonel Lambkin's Medium (p. 483).*

No. 10 died 205 days after inoculation.

„ 17	„ 367	„	„
„ 25	„ 385	„	„
„ 27	„ 399	„	„
„ 29	„ 360	„	„

*Rats treated with Lithium Antimonyl Tartrate, 0.25 per cent. (p. 485).*

No. 4 died 145 days after inoculation.

„ 5	„ 229	„	„
„ 6	„ 257	„	„
„ 8	„ 241	„	„
„ 10	„ 209	„	„

Most of the above rats died from cold; none of them died from the disease, and no trypanosomes were found in their blood or organs, and inoculations made therefrom were entirely negative.

#### B.—FURTHER EXPERIMENTS.

*Rats treated with Lithium Antimonyl Tartrate, 1 per cent.*

A further series of experiments has been carried out with this substance on a large number of rats, giving four doses of 4 to 5 minims (according to weight) of a 1-per-cent. solution subcutaneously, a dose being given every other day. Practically by this method every rat can be cured. They have lived for varying periods, up to 249 days, and in no case have trypanosomes been found after death in the blood or in the organs. No rat has died of the disease, and in no case thus treated has there been a recurrence. The results have therefore been more constant than those attained with sodium or potassium antimonyl tartrates. The treatment was begun on the third or fourth day after inoculation; it will be seen below that when it is left until the number of trypanosomes in the peripheral blood is very great, although they may be driven out of the blood, it does not cure; so that the time at which treatment is commenced is of considerable importance.

It has also been given intravenously in rabbits, but with far less effect than when given subcutaneously. The elimination in this case is very rapid, to which fact we attribute its comparatively feeble action.

*Rats treated with Lithium Antimonyl Tartrate on the Fifth or Sixth Day of the Disease.*

The blood at this period of the disease is swarming with trypanosomes, and experiments were made in order to see what effect this salt of antimony would have upon the disease at this period. If one dose of 5 minims of a 1-per-cent. solution be given the rats die on the seventh day, so that little or no effect is produced. If two such doses be given, one on the fifth and one on the sixth day, the average time of death in ten rats was nineteen and a half days, and living trypanosomes were found in the blood at death. When four doses were given, one on each day from the fifth to the eighth, the time in three rats was lengthened to eighty-one to eighty-six days; in one of these even living trypanosomes were found in the blood after death. By comparing these results with those mentioned in the former section it will be seen that the time at which the administration of the drug is begun is of importance, as well as the number of doses. The animals stand the best chance of cure when no recurrences take place, and this is best ensured by the method described in the previous section.

*Further Experiments made with Rats treated with Antimony in Order to find out in what Organs the Trypanosomes are latent.*

Following on the experiments made on rats treated with sodium antimonyl tartrate, with the view of finding out where the trypanosomes are latent, and recorded in the last paper,<sup>1</sup> a further series of experiments has been made on rats inoculated with Surra, which is more amenable to treatment with antimony than the Nagana used in the former series, and completely treated (that is, given a curative series of doses) with lithium antimonyl tartrate; this, as stated in the paper referred to, appears to be the most active of this variety of salt.

Seven rats were treated with four doses of 5 minims of a 1-per-cent. solution of lithium antimonyl tartrate, and they were killed in succession, one on the sixth, seventh, tenth, fourteenth, sixteenth, twenty-second, and thirtieth days after the last dose. The livers and bone-marrow were made into an emulsion with the minimum quantity of 0.89 per cent. salt solution, and 1 cc. of the emulsions of these organs and 1 cc. of heart's blood was injected separately into other rats. The results were entirely negative. Microscopic preparations were made of the material injected and no organisms were seen, and none of the sub-inoculations gave a positive result.

<sup>1</sup> *Proc. Roy. Soc., B*, vol. lxxx., p. 487.

*Experiments made in Order to see if any Protection was afforded by Initial Treatment with Antimony.*

A series of six rats was treated with four doses of 5 minims of a 1-per-cent. solution of lithium antimonyl tartrate, one dose every other day in the same manner as when given for curative purposes. They were then inoculated with Surra, one on the first day after the completion of the treatment, and one on the second, fourth, fifth, ninth, and tenth days after. They all died on the fifth or sixth day after inoculation, just as untreated rats would have done, so that antimony in this very soluble form is of no protective use in rats, owing most probably to its rapid elimination.

The blood of an uninfected rat treated as above has also been used in the *in vitro* experiments recorded below.

*Rats treated with Sodium Antimony Lactate and with Antimony Sodium Calcium Lactate.*

Through the kindness of Messrs. von Heyden we have been enabled to make some experiments with the above compounds. The sodium antimony lactate contains 26 per cent. of antimony, and the antimony sodium calcium lactate 17 per cent., so they are both much weaker in antimony than the tartrates which we have used. By the addition of a small quantity of lactic acid we were able to get a 1-per-cent. solution of both salts, and in this strength the solutions were not very irritating, but neither with rats nor with larger animals are they as effective as the tartrates or the metal.

The following table shows the results obtained with sodium antimony lactate 1 per cent.

Average duration of untreated disease 6·9 days :—

Rats of 150 to 200 grammes weight	Number of doses, and quantity	Recurrences	Lived	Remarks
1	2 of 4 minims	0	9 days	Died from enteritis.
2	4 of 4 "	0	20 "	Died from retained fœtus.
3	4 of 4 "	1	37 "	—
4	5 of 4 "	1	46 "	—
5	6 of 4 "	2	100 "	} (No trypanosomes found in any of these rats after death.)
6	4 of 5 "	0	74 "	
7	5 of 5 "	1	48 "	

The following table shows the results obtained with antimony sodium calcium lactate 1 per cent.

## Average duration of untreated disease 6·9 days:—

Rats of 150 to 200 grammes weight	Number of doses and quantity	Recurrences	Lived	Remarks
1	3 of 4 minims	1	83 days	No trypanosomes found <i>post mortem</i> .
2	4 of 4 "	0	25 "	Living trypanosomes found <i>post mortem</i> .
3	5 of 4 "	2	68 "	No trypanosomes found <i>post mortem</i> .
4	6 of 4 "	2	45 "	" " "
5	5 of 5 "	2	64 "	" " "
6	6 of 5 "	2	68 "	" " "
7	8 of 5 "	2	57 "	" " "
8	4 of 7 "	0	131 "	" " "

On dogs the effect was very much less marked than on rats, and an effective dose became inconveniently large.

The following experiments show the relatively greater time taken for these salts to act as compared with the sodium or lithium antimonyl tartrates, which drive all the trypanosomes from the peripheral blood in about an hour after the dose.

A Surra rat was taken on the fourth day, when the trypanosomes are numerous in the blood, and 5 minims of a 1-per-cent. solution of sodium antimony lactate were injected.

Blood was taken and showed the following:—

Half hour after injection: Trypanosomes affected by the drug are extremely active, and show a tendency to swell.

One hour after injection: Very few normal trypanosomes to be seen; nearly all are swollen and spherical in shape (= "battledores"). Still large numbers.

One and a half hours after injection: Much smaller number of trypanosomes to be seen; a few "battledores"; a few motionless ones, and one or two normal forms.

Two hours after injection: "Battledores" have all disappeared; one or two slowly moving normal forms seen.

Two and a half hours after injection: Ditto.

Three and a half hours after injection: No trypanosomes found.

A similar experiment made with a rat treated with antimony sodium calcium lactate yielded practically the same result. Further experiments made with these drugs *in vitro* will be mentioned later.

*Experiment made with Antimony (Metal in state of finest Division) suspended in various Oily Media.*

Since the curative results following treatment with the metal antimony<sup>1</sup> suspended in Colonel Lambkin's medium seemed

<sup>1</sup> Roy. Soc. Proc., B., vol. lxxx, p. 488.

promising, many trials have been made with the metal suspended in other oily media, such as olive oil, cod-liver oil, lanolin, egg-yolk, &c., in order, if possible, to obviate, or at any rate reduce, the extremely irritating properties of the metal, which seriously interfere with its practical use.

In olive oil a 5-per-cent. suspension was used; with one dose of 3 minims Surra rats lived for fifteen days, and died with living trypanosomes in their blood. Seventeen Surra rats were given one dose of 5 minims on the fourth day of the disease, and they lived from 41 to 133 days; in these there were no recurrences, nor were trypanosomes found after death, and sub-inoculations were in every case negative. Six Surra rats were treated with the same dose in order to observe the time taken for the complete disappearance of the trypanosomes from the blood.

Blood was taken and showed the following:—

Half hour after injection: Trypanosomes very active.

One hour after injection: As numerous; show evidences of swelling.

One and a half hours after injection: Still numerous; nearly all swollen; some "battledores."

Two hours after injection: Very few forms found; all "battledores."

Two and a half hours after injection: No trypanosomes seen.

Two Surra rats were taken on the fifth day, when the blood was swarming with trypanosomes, and 6 minims were given. Two and a half hours after the rats were killed, and smears were made from the lungs, liver, spleen, kidney, bone marrow, heart's blood, and brain. In none of the specimens could a trypanosome be found after prolonged examination.

This oil was also given to several rats upon recurrences after treatment with small doses of the lactates mentioned above; in these cases the effect was much less marked, even although the number of trypanosomes in the blood was much less than in the rats treated for the first time. This accords with our general experience that recurrences are much more difficult to deal with than the initial infection, and this applies to all the drugs we have tried.

A suspension in cod-liver oil took four hours to drive the trypanosomes out of the peripheral blood.

The suspension in egg-yolk appeared to act in rats better than in any other. In dogs, however, the results were variable; sometimes strikingly good, at others no better than the other mixtures; sometimes causing great irritation and sloughing, sometimes not

causing any irritation at all. We have rats alive for more than 120 days after inoculation, with no recurrences, after one dose.

An experiment was made to see how long one dose took to drive the trypanosomes out of the blood. A Surra rat on the fourth day was treated with 5 minims of a 5-per-cent. suspension.

Blood was taken and showed the following :—

Three-quarters of an hour after injection: Trypanosomes much affected, but not decreased. Many “battledore” forms.

One and a quarter hours after injection: Trypanosomes reduced in numbers; all swollen and “battledore” forms, very little movement.

Two hours and a half after injection: No trypanosomes found.

#### *Experiments with Quassia.*

Dr. Guillemand, of Cambridge, suggested that quassia, on account of its known poisonous effects on some of the lower forms of life, should be tested for its trypanocidal qualities. A series of experiments was therefore undertaken on rats.

Six Surra rats were treated on the third and following days of the disease with a 5-per-cent. solution of the pharmacopœial extract of quassia; they were given three doses subcutaneously—5 minims on the third day, 10 minims on the fourth, and 10 minims on the fifth day. The trypanosomes were entirely unaffected, and the animals died on the sixth to seventh day. Another series of twelve Surra rats was treated with a two hours' decoction of quassia-wood made with the minimum amount of water. Of this three doses were given—5 minims on the third day, and 10 minims on the fourth and fifth days. The trypanosomes in these rats were also entirely unaffected, and the animals died on the sixth to seventh day. It was also tried intravenously in rabbits in doses of 30 minims of the decoction; no effect was produced, and the rabbits died on or about the forty-second day.

Experiments made *in vitro* correspond with these results, and will be described later.

#### *Experiments with Arsenophenylglycin.*

Professor Ehrlich kindly sent some of this substance to Dr. Bagshawe, the Director of the Sleeping Sickness Bureau, with which we have made some initial experiments upon rats. Ehrlich found that Nagana mice could be cured, in practically every case, with this substance. But the effects on larger animals, so far as we have gone, are not quite so satisfactory, and it compares in this

undesirable manner very well with the antimony tartrates, with which we can cure practically every case of Surra in rats, but which do not have anything like the corresponding effects on rabbits, guinea-pigs, and dogs. It is not only in the question of practical dosage that difficulties arise: each kind of animal has a personal equation, and their reaction to a given drug is not similar. This, and the relatively larger dosage in bigger animals, present considerable practical difficulties in the treatment of trypanosomiasis.

Our experiments have given the following results. Out of eight Surra rats of 180 to 200 grammes weight which were given one dose of 25 minims of a 1-in-80 solution of arsenophenylglycin, four died on the nineteenth day with living trypanosomes in their blood, the recurrences having taken place on the sixteenth to seventeenth day. Two were given three and five doses respectively of 5 minims of a 1-per-cent. solution of lithium antimonyl tartrate on the seventeenth and following days, and they lived fifty-nine and fifty-one days. Of the two which are still living (ninety-five days), one has had five doses of 5 minims of a 1-per-cent. solution of lithium antimonyl tartrate, beginning on the seventeenth day, and the other had one similar dose given on the day before the recurrences occurred in the other rats.

The following experiment shows the effect of this substance upon the trypanosomes in the blood, and how much longer it takes than the antimony salts to produce its effects.

A Surra rat on the fourth day of the disease was treated with 1 cc. of a 2-per-cent. solution of arsenophenylglycin (practically the same dose as given to the other rats).

Blood was taken and showed the following:—

Half hour after injection: Trypanosomes showed slight increase of motility.

One hour after injection: Trypanosomes showed slight increase of motility.

Two hours after injection: Trypanosomes, but more marked.

Three hours after injection: Trypanosomes not quite so active and fewer in number.

Four hours after injection: Trypanosomes now very few in number.

Four and a half hours after injection: Only one or two trypanosomes to be seen in a preparation.

Five hours after injection: No trypanosomes seen.

In these specimens no swollen, breaking up, or "battledore" forms were seen; the trypanosomes simply disappeared.

*On the Effects of the Drugs used upon the Trypanosomes in the Living Body.*

In studying the therapeutic effect of the various drugs tried, including metallic antimony in a state of finest division, repeated observations of the peripheral blood were made in order to observe the effect of the drug upon the trypanosomes, and to ascertain when the trypanosomes entirely disappeared from the blood. The first stage noticed of the effect of the drug was a great increase in the motility of the trypanosomes, followed by a gradual slowing down to movements slower than normal. At this stage there is a tendency for the whole trypanosome to swell and to become bloated in appearance. The swelling of the trypanosome continues until it becomes almost spherical in form, or oftener "battledore" shaped; the protoplasm becomes indistinct, and the flagellum appears to be attached to only one side of the periphery; the macro-nucleus is fairly distinct, but it eventually breaks up, and then the swollen mass disintegrates. The spleen at this time is full of these broken-up masses of trypanosomes, and as the nuclei will still stain, in films a plasmodial appearance is seen of bits of nuclei dotted about in a granular ground. These stages can be observed after treatment with all the salts of antimony used, and are well marked after the administration of the metal, in which case, however, the stages are slower. The soluble salts, lithium and sodium antimony tartrates, effect the total disappearance of the trypanosomes in about one hour. Metallic antimony, when given in the various media tried (Lambkin's medium, olive oil, cod-liver oil, heavy paraffin oil, egg-yolk), brings about this disappearance in from two and a half to four hours, according to the medium used; the first noticeable effects being produced in about half an hour. In the case of egg-yolk and olive oil the blood is free from trypanosomes in two and a half hours. This would seem to show that some portion of the metal introduced must be changed into some soluble form very rapidly; but apparently after the reaction of the tissues occurs the antimony becomes more or less shut off, and absorption must take place very slowly, as traces of the metal, apparently unaltered, have been found as late as six to seven weeks after the injection.

Sodium antimony lactate and antimony sodium calcium lactate were found to act rather more slowly than the above (see Table), the time at which the trypanosomes had completely disappeared varying from three to four hours.

It was noticed in these experiments that trypanosomes, though obviously drug-affected when the blood was taken, remained alive

on the slide outside the body for a long time after all forms had disappeared from the circulating blood.

Further details of the time taken for the various drugs to act will be found in the sections upon sodium antimony lactate, antimony oil, antimony egg-yolk, and arsenophenyglycin.

*On the Action of Trypanocidal Substances in vitro.*

Experiments have been carried out with a view of throwing light on the more exact nature of the changes which are produced in trypanosomes when they are brought into contact with trypanocidal substances. The general principles we have observed in these experiments have been: (1) To dissolve the drug in some fluid so that when it is added to the infected blood it will not cause osmosis to occur in the cellular elements of, or trypanosomes contained in, the blood. (The various substances were dissolved in a 0.89-per-cent. salt solution, isotonic with rat's blood which was used in these experiments.) (2) To use always equal volumes of the solution and of the affected blood. (3) To use blood at the time when the trypanosomes are just becoming very numerous, so as to avoid the presence of old, feebly-moving forms, which are always present in the later stages of an acute infection. The method of observation has been to watch the behaviour of the trypanosomes when in contact with the various solutions of the drug under the microscope. A measured drop of blood and of the solution are mixed on a slide with care; the mixed drop is then covered with a sufficiently large cover-glass, and this is sealed with vaseline.

It has been found possible in this manner to exactly determine the dilutions at which the various drugs used cease to have an instantaneously trypanocidal action; further, in higher dilutions, by carefully watching the changes taking place in the trypanosomes, it is possible to determine the dilution at which no effect is produced, and between these two points the periods of time necessary to ensure immobility and death of the trypanosomes can be ascertained. By a comparison of the results obtained a very good estimate of the probable action of any drug when given to an infected animal can be arrived at.

For instance, sodium and lithium antimonyl tartrates were found to act, in the same dilutions, in a manner fairly comparable to their antimony content, and to their action on the trypanosomes in an affected animal. Again, with atoxyl a much higher concentration of the drug was necessary—it had to be about ten times stronger—in order to obtain the same destruction pictures, results corresponding with the rapidity of the disappearance of trypano-

comes from the peripheral blood of affected animals when treated with the above drugs.

In the case of the two new lactates mentioned above, their therapeutical value was accurately foretold by a preliminary study of their action *in vitro* in the manner described. In all these experiments controls have been carried out; it has been found that trypanosomes will live and retain their activity for hours when infected blood and the diluting fluid alone are mixed together.

The various changes taking place in trypanosomes on coming into contact with a dilute trypanocidal drug, commencing with their preliminary extraordinary increase of activity, and their subsequent swelling up, immobility, and disintegration, can be watched in all their different stages in this manner. These effects resemble very closely the change which take place in the trypanosomes in the peripheral circulation of an animal treated with antimony.

The following tables show the effects produced by the different substances in their various dilutions.

Dilutions of sodium antimonyl tartrate in 0.89-per-cent. salt solution mixed with Surra rat's blood, in equal parts. The control in all cases is equal parts of blood and 0.89-per-cent. salt solution.

Dilutions				Time	Control
1—500	1—1,000	1—5,000	1—10,000		
Motionless	Motionless	Few active forms	Trypanosomes active	1 min.	Very active
"	"	Motionless	Few active forms; rest sluggish	10 min.	"
"	"	"	All sluggish.. ..	30 "	"
"	"	"	Motionless .. ..	1 hour	"

Dilutions of lithium antimonyl tartrate in 0.89-per-cent. salt solution mixed with Surra rat's blood in equal parts.

Dilutions					Time	Control
1—500	1—1,000	1—5,000	1—10,000	1—20,000		
Motionless	Motionless	Some active trypanosomes	Active trypanosomes	Very active trypanosomes	1 min.	Very active
"	"	Motionless	Some active trypanosomes	Many active trypanosomes	10 min.	"
"	"	"	Practically no motile trypanosomes seen, only 1 or 2 in a slide. Tendency to clump	Few active trypanosomes seen. Tendency to clump	30 "	"
"	"	"	Motionless ..	1 or 2 active forms seen. Rest motionless	1 hour	"

## 12 *Experimental Treatment of Trypanosomiasis*

In a dilution experiment with lithium antimonyl tartrate made with the blood of a Surra rat after a second recurrence, after treatment with antimony (metal) and on first recurrence with lithium antimonyl tartrate, the trypanosomes *in vitro* appeared to have a greater resistance to the dilute drug than the stock strain.

A comparison of the following table with the previous one will demonstrate this:—

Dilutions										Time		
1-1,000					1-5,000							
A few active forms present					..	A number of active forms present					1 min.	
Motionless					.. .. ..	..	A few active forms seen					10 min.
,,					.. .. ..	..	Motionless					30 ,,

This bears out our experience that the recurrences become less and less amenable to antimony as they increase in number.

The following table shows the action of atoxyl and lithium antimonyl tartrate compared in the above manner:—

	Dilutions of atoxyl			Time	Dilutions of lithium antimonyl tartrate		
	1-500	1-1,000	1-5,000		1-500	1-5,000	1-10,000
Trypanosomes, all active	Active ..	Active ..	Active ..	1 min.	Trypanosomes, all motionless	All markedly affected	All fairly active.
Active but affected	„ ..	„ ..	„ ..	5 min.	Motionless; commencing disintegration	Motionless..	Less active.
Less active	Sluggish, but still many active	„ ..	„ ..	15 „	Only debris seen	„ ..	Some still moving; tendency to clump.
Practically motionless	Nearly all motionless; one or two active forms seen	Many moving still	Many moving still	2 hr.	„ „	Disintegrated	Motionless; some disintegration.

Concentrated decoction of quassia in 0.89-per-cent. salt solution mixed with Surra rat's blood in equal parts.

Dilutions				Time	Control
1—500	1—1,000	1—5,000	1—10,000		
Very active..	Very active..	Very active..	Very active..	1 min. ..	Very active.
" ..	" ..	" ..	" ..	10 min. ..	"
" ..	" ..	" ..	" ..	30 ..	"
" ..	" ..	" ..	" ..	1 hour ..	"
Less active..	Less active..	Less active..	Less active..	2 hours ..	Less active.

The conditions of the dilutions and the control were precisely similar at the end of two hours. There was no swelling or clumping.

Dilutions of arsenophenylglycin in 0·89-per-cent. salt solution mixed with Surra rat's blood in equal parts.

Dilutions					Time	Control
1—100	1—500	1—1,000	1—5,000	1—10,000		
Very active	Very active	Very active	Very active	Very active	1 min.	Very active.
Irritated : move- ments rapid and con- vulsive	Activity in- creased	"	"	"	10 min.	"
Nearly motion- less	Sluggish ..	"	"	"	30 ..	"
Motionless	" ..	"	"	"	1 hour	"

*Experiments in vitro performed with the Blood of a Normal Rat which had been treated with Antimony.*

Experiments were made in order to ascertain whether the blood of a rat which had been treated with antimony would show any active trypanocidal powers *in vitro*. Although in the case of an infected animal all the trypanosomes in the peripheral blood would have been destroyed in about an hour, no noticeable trypanocidal effects were shown by the blood of a treated rat in the following experiments.

A normal rat had 5 minims of a 1-per-cent. solution of lithium antimonyl tartrate injected subcutaneously; its blood was taken at fifteen, thirty, sixty, and seventy minutes after the injection, and was mixed with an equal quantity of blood from a Surra rat containing many trypanosomes; the mixed bloods, taken at the times mentioned, were examined under the microscope at various intervals

from five to thirty minutes after the mixing, and the trypanosomes were found to be entirely unaffected, so that the blood of the treated normal rat did not have any trypanocidal effect added to it by the dose of lithium antimonyl tartrate. The Surra rat, whose blood was used for this experiment, was then given 5 minims of a 1-per-cent. solution of lithium antimonyl tartrate.

Blood was taken and showed the following :—

Ten minutes after injection : Trypanosomes affected ; movement very rapid.

Twenty minutes after injection : Many “ battledores.”

Forty minutes after injection : Trypanosomes greatly decreased in number all “ battledores.”

Sixty minutes after injection : Blood quite free from trypanosomes.

A normal rat was given four doses subcutaneously, one every other day, of 5 minims of a 1-per-cent. solution of lithium antimonyl tartrate; twenty-four hours after the last dose a drop of its blood was mixed with a drop of blood from a Surra rat in which trypanosomes were plentiful. The mixture was watched under the microscope for half an hour, but no effect was produced ; the blood of the treated animal behaving just as the blood of the control, an untreated rat.

A normal rat was given subcutaneously 10 minims (a lethal dose) of a 1-per-cent. solution of lithium antimonyl tartrate, and its blood was mixed at half an hour, one hour, and one and a half hours after the injection with an equal part of an emulsion of trypanosomes prepared from the lungs, liver, and heart's blood of a Surra rat just dead. Each of the mixtures was examined up to thirty minutes, but no effect whatever was produced on the trypanosomes. These experiments may be compared with those recorded on p. 4.

#### *Experiments with Antimony upon Dogs.*

Since the date of the last paper a large number of experiments have been made with antimony in various forms upon dogs suffering from Surra. Of the five dogs mentioned there, one remains alive and well at the present date, more than a year after inoculation.

Our experiences with dogs show that they are extremely susceptible both to the disease and also to antimony; they are therefore not quite suitable animals for these experiments, although they have all lived many times the length of the untreated disease—that is, fourteen days. Five of the dogs were treated with small doses of sodium antimonyl tartrate in their drinking water, but the disease is so acute in dogs that this method of giving the drug,

although it appeared to have some effect in postponing the reappearance of the trypanosomes in the blood, did not produce results sufficiently encouraging to warrant further experiments.

With regard to the experiments made with metallic antimony suspended in egg-yolk, the initial experiment was so encouraging as to make a further trial necessary. In this case the dog at the first relapse was given 20 minims of a  $2\frac{1}{2}$ -per-cent. suspension; there was no local reaction, which in dogs is of frequent occurrence after the administration of antimony in any form, and the trypanosomes, which were very numerous, were entirely absent from the blood in twenty-four hours; the dog remained quite free from them for forty-eight days, and gained 3 lb. in weight and appeared perfectly well. The recurrence was very sudden, as the dog was perfectly well up to the moment when he was seized with a series of fits which ushered in the recurrence from which he did not recover. A rat treated at the same time as this dog with 5 minims of the same suspension is alive and well more than 100 days after this one dose.

Many of the dogs mentioned in the table below have died with fits and paralyses and other nervous symptoms, but we are not certain whether these are due to the disease or to the antimony. In certain of the dogs the treatment has appeared to alter the acute disease into a chronic one, and in one of these more chronic cases there was a considerable excess of cerebrospinal fluid and a cellular exudation around the vessels in the brain, very similar in incidence and extent to that described and figured by one of us in rats dead from infection with *Trypanosoma gambiense*.<sup>1</sup>

There is a curious uncertainty in the local effects produced in dogs by antimony, whether injected subcutaneously or intramuscularly, and they vary from time to time in the same dog; sometimes little or no effect is produced, and sometimes the suppuration and necrosis produced are sufficient to kill the animal.

We have recently given twenty-four injections of lithium antimonyl tartrate subcutaneously to three dogs in the greatest possible dilution. Of these, three places have suppurated slightly, although the conditions under which they were given were similar to those under which the twenty-one other doses were given. (These dogs are now living and well fifty-three days after inoculation, and they have had no recurrences.)

The following table gives a synopsis of the treatment, &c., of Surra dogs:—

<sup>1</sup> *Roy. Soc. Proc.*, B, vol. lxxix., p. 95.

# AVERAGE DURATION OF UNTREATED DISEASE, FOURTEEN DAYS.

No.	Weight, in kilos	Number of doses	Quantity of dose, in minims	Material	Recur- rences	Remarks
1	11	2	20	5 per cent. ant. cream	2	<i>Dog is alive and well 373 days after inoculation.</i>
2	11	2	20	sod. ant. tart.	3	Died on 94th day. no trypanosomes found for 21 days before death.
		4	20	"		There were 41 days between the first and second recurrences.
		8	20	lith. ant. tart		Died with fits and nervous symptoms.
3	18½	4	20	sod. ant. tart. cream...	6	Died on 67th day; no trypanosomes found for 22 days before death.
		2	20	"		Died with fits and nervous symptoms.
		1	20	"		
		2	20	ant. cream		
4	8	3	12	lith. ant. tart.	4	Died of distemper on 63rd day. No trypanosomes found for 7 days before death.
		3	12	sod. ant. tart. cream...		
		1	20	"		
		7	12	lith.		
5	6½	3	10	sod.	3	Died of pneumonia on the 53rd day. No trypanosomes found for 11 days before death.
		2	20	lith.		
		3	10	"		
6	6½	5	10	"	1	Died from abscess on the 40th day. No trypanosomes found for 17 days before death.
		4	20	"		
7	7½	5	10	"	3	Died from abscess on the 61st day. No trypanosomes in blood for 10 days before death.
		7	20	"		
8	14½	4	20	"	2	Died on 55th day with fits and nervous symptoms. Trypanosomes in blood. Antimony given in water also.
		2	12	ant. oil		
9	12½	2	15	lith. ant. tart...	2	Died on 77th day from abscess. No trypanosomes seen for 16 days before death. Antimony given in water also.
		2	15	ant. oil		
		2	15	"		
10	13½	1	20	"	3	Died on 63rd day with nervous symptoms and paralysis. No trypanosomes found. Antimony given in water also.
		2	12	lith. ant. tart.		
		1	20	"		
		1	15	"		
11	8½	3	20	ant. sod. lact.	4	Died on the 66th day with nervous symptoms. No trypanosomes found after death. Antimony given in water also.
		1	15	lith. ant. tart.		
		1	10	ant. oil		
		1	15	"		
		5	24	"		
		1	15	"		
		2	15	"		
12	10	1	20	"	3	Died on the 65th day with living trypanosomes in blood. Antimony given in water also.
		2	10	"		
		2	15	"		
		2	15	lith. ant. tart.		
		4	15	"		

13	114	1	20	2	lith. ant. tart...	1	1	114
			15	24	aut. oil		1	
			15	5	"		2	
14	104	2	20	5	"		1	104
		2	15	5	"		2	
		1	20	5	"		1	
15	134	1	15	2	lith. ant. tart.		1	134
		2	20	2	"		2	
		1	15	5	"		1	
		2	20	5	ant. oil		2	
16	94	3	20	5	lith. ant. tart.		3	94
		1	15	2	"		1	
		2	15	5	"		2	
17	94	1	10	24	ant. oil		1	94
		2	15	5	egg ant.		2	
18	94	1	15	2	aut. oil...		1	94
		2	15	2	lith. ant. tart		2	
		1	15	5	"		1	
		2	15	5	ant. oil		2	
19	104	1	20	1	ant. sod. lact.		1	104
		1	15	2	lith. ant. tart.		1	
		1	15	5	"		1	
		1	10	5	"		1	
		1	20	5	ant. cream		1	
		1	20	24	egg ant.		1	
20	74	1	10	24	"		1	74
		3	15	5	"		3	
21	134	1	15	5	"		1	134
		2	10	5	"		2	
22	84	1	15	2	lith. ant. tart.		1	84
		3	15	24	egg ant.		3	
23	134	1	15	5	lith. ant. tart.		1	134
		2	15	5	egg ant.		2	
		2	20	5	"		2	
		2	15	5	lith. ant. tart		2	
24	124	1	15	5	"		1	124
		1	15	5	egg ant		1	
		1	20	5	lith. ant. tart.		1	
		1	15	5	"		1	
		1	10	5	"		1	
25	94	5	5	5	"		5	94
		1	10	5	egg ant.		1	
		1	20	5	"		1	
26	8	5	5	5	lith. ant. tart.		5	8
		1	10	5	"		1	
		1	20	5	egg ant.		1	
		5	5	5	lith. ant. tart.		5	

1 Died on the 60th day with nervous symptoms. No trypanosomes seen for 29 days before death.

2 Died on the 52nd day from abscess. No trypanosomes found after death.

5 Died on the 50th day with living trypanosomes in blood.

— Died on the 64th day from abscess. No trypanosomes found after death and no recurrences.

— Died on the 48th day from pneumonia. No trypanosomes found after death.

1 Died on 50th day, possibly from ant. sod. lactate. No trypanosomes found after 4th.

3 Died on 74th day with nervous symptoms. There were 48 days between the first and second recurrences.

— Trypanosomes practically never out of blood. Died on the 37th day, paralysed

— Trypanosomes practically never out of blood. Died on the 44th day with fits and nervous symptoms.

— Trypanosomes practically never out of blood. Died on the 55th day with fits and nervous symptoms  
3 Died on the 55th day with fits and nervous symptoms.

2 Died on the 64th day with living trypanosomes in the blood.

2 Died on the 56th day with nervous symptoms.

2 Died on the 47th day. Trypanosomes found in the cerebrospinal fluid.

# MEDICAL HISTORY OF THE SOUTH AFRICAN WAR.

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*Royal Army Medical Corps.*

*(Continued from p. 505, vol. xiv.)*

(vi.) We are now in a position to consider *the development as a whole from October, 1899, to July 27th, 1900, of the continued fevers and bowel complaints as they occurred on the western line and in Bloemfontein*, in conjunction with the conditions observed in Natal.

(a) The bowel complaints may be dismissed in a few words. While the troops were in occupation of the line, or in touch with it, that is till about March 9th, the distribution curve (fig. 7) shows the very great sensitiveness to an addition to strength. The sudden rise in the week ending November 29th coincides with Lord Methuen's concentration; the rise from the week ending January 26th coincides with the concentration for the advance into the Free State. After this, the condition, as has been pointed out, is one of comparatively small oscillations of a period of approximately two weeks about a mean level; there is no attempt at the production of a definite maximum, and the whole character of the distribution is in marked contrast to that of the continued fevers, with which the only point of similarity lies in the descent from June 8th. This is exactly the condition seen in the Natal Field Army. Further remarks on the relation between the early bowel complaints and fevers will be found at the end of this section.

It may be noted here that throughout the war the admissions for dysentery varied less from month to month than did those for enteric fever. The annual range was less, and the seasonal influence less distinct (see fig. 11).

(b) Instead of considering the development of the continued fevers on the Western line and in Bloemfontein alone, it is more convenient to take them along with those already described in the garrison of Ladysmith and the Natal Field Army, in the endeavour to ascertain what common features they have, and what is to be learned from them in relation to prevention.

There are two possible views as to the manner in which these and similar epidemics arise. One may be termed the hypothesis of *infection from without*, mass infection, the second that of *infection from within*, or, shortly, auto-infection. Infection from without, or infection in the mass, is taken to mean the infection

of a body of men by a general source outside of and previously unconnected with that body; it has, therefore, a definite date of commencement, and if investigations can be pursued far enough, this date can be correlated with exposure to some known source of infection. One may take as an example an exclusively water-borne epidemic such as that at Worthing. Internal, auto-infection is taken to mean the gradual and, at last, general infection of a body of men of whom a *comparatively small number* are already infective (carriers), or have become infected by some external source. The characters of mass infection are well known: the sudden occurrence of a large number of cases after an interval of about the normal incubation period from the date of infection, followed by a more gradual decline. Auto-infection takes a different form: the first few cases form fresh foci, and with the normal incubation period determining the intervals, the progress and multiplication of cases should be of the type of a geometrical progression, which, however, in practice is always and fortunately limited in the number of its terms, presumably by the inequality in susceptibility in the persons exposed and by the exhaustion of the susceptible population. Otherwise, it is difficult to see why such an outbreak should ever stop.

Now it is of considerable practical importance to ascertain how far one or other type will account for epidemics. Protection against infection in the mass is probably not impossible; sanitary measures which are comparatively simple and practicable can be carried out without difficulty. Auto-infection is much more difficult to deal with; it means the elimination of apparently healthy but infective individuals, of all the minor types of infection—diarrhoea, ephemeral fever, &c.; the isolation of the sick and convalescents (the latter probably permanently so far as the campaign is concerned), and, more difficult still on service, of contacts, besides the full and careful maintenance of all the sanitary measures which are organized for the protection of the force from infection from the outside. The distinction between these two types is not in practice absolute; a water epidemic, for example, begins as an external infection, but usually shows in the manner of its decline evidence of some degree of auto-infection; but the difference between the two types in the mode of development and the possibility of prevention is absolute.

For these reasons it appears to be useful to spend some time in considering the prevalence in the four groups which have been described. The materials allow only of the crudest method of

treatment, but some results appear attainable which, if not absolutely accurate, are at least suggestive.

The epidemics in Ladysmith (the first part), South Natal and on the Western line, show, when plotted, curves of the same type (figs. 2, 4, and 7). They show a maximum, termed for convenience "the apex," a portion which would not be inadequately represented by a straight line, separated from an earlier, more irregular, portion by a sudden change of curvature. Each one of these irregular polygons as plotted can be fairly represented by a continuous curve drawn from the same template, and in each the earlier irregular portion shows an incidence less than that shown by the continuous curve.

Now the dates at which the exposure of the respective bodies of men began are known, the dates of the maxima are available (except on the Western line), and the date on which the straight line portion began may be determined by inspection of the diagram with comparative accuracy. Tabulating these results we find a close agreement:—

Group	Beginning of straight line				Apex	
Ladysmith	..	..	..	In 8th week	..	11th to 12th week.
S. Natal	..	..	..	"	..	12th week.
W. Line	..	..	..	About 8th week	..	(?)

The weeks are counted from the date of exposure.

It appears to be justifiable to take as a working hypothesis that the period of invasion of the epidemic is about eight weeks, or more than twice any possible individual incubation period, and that it takes about four weeks longer to attain its maximum.

We can now attempt to apply this hypothesis to the case of the epidemic in Bloemfontein. The first maximum there—that of April 13th—conforms to the conditions seen above, the beginning of the straight line portion is in the eighth week from January 26th, and the apex is twelve weeks from the same date. That date is practically the beginning of the concentration period on the Western line. The next two apices are less easy to deal with. Their relation to possible external causes has already been spoken of, and it has been seen that it is difficult to trace any connection between them and any definite and known source of infection, widespread but of limited duration—a condition which is required to explain the short period of development of these maxima.

Now if we take the figures for the prevalence in South Natal, and eliminating the irregularities by taking the means of any two successive weeks instead of the actual numbers for these weeks, if we add the same series of numbers *twice* to the original set, at intervals corresponding to the intervals between the maxima in

Bloemfontein, and then plot the resulting series of figures, we obtain a curve of the same general character as that in Bloemfontein, with three maxima separated by deep gaps. There are, however, certain important differences which are due to the character of the Natal curve, which shows only a very short period of decline. This is of course a very crude method, but it suffices to show that three similar but independent epidemics superposed will produce a curve of the characters shown, without any necessity for the assumption of specific instances of widespread infection at definite times, and it points to the gradual development of each epidemic in the same way as is seen in the Natal groups described above. The differences seem to show that in all probability the growth of the second and third epidemics, superposed on that beginning on the Western line, was rather more rapid than in the cases shown above. This is *a priori* probable, as the chances of infection increased with the number of troops brought into the area, and the opportunities for infection were multiplying rapidly during March and probably April, so that one might expect to find the number of cases increasing more rapidly than in the earlier epidemics, because of the greater number of foci introduced into the group.

We can now consider the probabilities regarding the two later maxima. In both the origin of straight line portion of the hypothetical curve is obscured, but in the examples already given the apex has been found to have a fairly constant relation to the origin. Hence, in relation to the maximum of May 18th, the earliest possible date for the origin is February 23rd, towards the end of the investment at Paardeberg. This agrees well with the known conditions, but the suggestion of a shortened development may place the origin actually in the early days of the occupation of Bloemfontein. As regards the maximum of June 8th, the earliest possible date for the origin is March 16th, so that this outbreak certainly originated in Bloemfontein. Summing up the possibilities under the two heads, external infection and auto-infection, and indicating the epidemics by the dates of their maxima, we find:—

April 13	..	External infection	..	Not earlier than February 23, at Paardeberg.
.. 13	..	Auto-infection	..	Continuous development from the Western line.
May 18	..	External infection	..	Not earlier than mid-April.
.. 18	..	Auto-infection	..	Possibly Paardeberg; probably Bloemfontein in the early days.
June 8	..	External infection	..	About middle of May.
.. 8	..	Auto-infection	..	Soon after occupation of Bloemfontein.

Either hypothesis will conform with the actual conditions, except that, as pointed out above, there are difficulties in pointing out *special* intensities of infection which seem necessary for the explanation of the sudden sharp rises of the two later maxima. Auto-infection places the origin, *i.e.*, the first cases and the limited early infection, considerably earlier than external infection—the infection of considerable numbers. The actual dates of infection are of no moment; what is important is to ascertain, if possible, whether mass infection (which can with great care be prevented) is the effective agent, or whether the slower, less definite and much more intractable, gradual infection of the whole mass from the infectivity and infection of small numbers is in practice not only possible but probable. The summary shows that if a full incubation period of about three weeks is allowed, the infection which determined the epidemic April 13th may have taken place at Paardeberg. But there seems little doubt that this particular epidemic was the result of continuous development from the Western line. Similarly, if we allow a three weeks' incubation for the epidemics culminating on May 18th and June 8th, the infection may be dated back to somewhere about the middle of April and of May respectively. The sudden rise in these two epidemics may represent the maturation of specific infection of large numbers, but from the very sharpness of the rise, if instances of specific infection were the cause, these infections must have been widespread, and of *limited duration*. They are of the type of a sudden general infection. Opportunities for infection were undoubtedly frequent; what is not known is the existence of a sudden increase in the intensity of the infection lasting but a short time.

Neither of the methods of development ever works alone; it is really a question of degree. But there is certainly sufficient evidence to show that the prevalence of specific febrile disease in the field is not determined alone, or even chiefly, by a mode of infection which may be prevented by what are ordinarily included under the term “sanitary precautions”—that is, by the provision of a pure water supply, which of itself will never stop its development, nor by the successful execution of the more difficult task of preventing the spread of infection from latrines and urinals, or their equivalents; that effective preventive measures involve the treatment of the specific fever, enteric fever, as if it were, as in fact it is, as easily spread, and by the same modes as any other member of the group. These effective preventive measures must include isolation and disinfection of the patients (both in the acute and

convalescent stages), of the attendants and of all contacts; and those who have practical experience of war conditions, especially with a large native establishment in close relation to the troops, will easily recognize the difficulty of carrying out these measures, absolutely essential if disease of this type is to be eliminated.

The other side of the question is the development of the bodily resistance. This is successful in a considerable degree under the milder conditions of peace, but even if the result under war conditions is as good as this, there will remain a material incidence of enteric fever which will have to be dealt with in some such way as is suggested—by the elimination of the element of personal infection, whether direct or indirect.

(c) Another important point is the relation of the group of bowel complaints to the outbreaks of continued fevers. This comparison is facilitated by first of all tabulating the features of the occurrence of bowel complaints under certain heads:—

#### CHARACTERISTICS OF THE GROUP "BOWEL COMPLAINTS."

##### *Ladysmith.*

Duration of observations, twenty-one weeks, October 13th, 1899, to March 2nd, 1900.

Early appearance and rapid development.

Considerable similarity to febrile disease curve.

Curve characteristic: definite maxima in twelfth and twenty-first week.

Predominant type dysentery till seventeenth week (4 to 1).

Increase of diarrhœa towards end of period; first maximum dysentery, second diarrhœa.

##### *Natal Field Army.*

Duration of observations, fifteen weeks, November 24th, 1899, to March 2nd, 1900.

Early appearance and rapid development.

No similarity to febrile disease curve.

Sudden rise to an irregular mean incidence.

Oscillations considerable.

Predominant type dysentery (2 to 1).

Steady increase of diarrhœa during the first nine weeks, in addition to dysentery.

##### *De Aar.*

Unimportant.

*Orange River.*

Duration of observations, eighteen weeks, October 20th, 1899, to February 16th, 1900.

Early appearance, irregular development.

No similarity to febrile disease curve.

Characters very irregular.

Predominant type dysentery first nine weeks, declining and replaced by diarrhœa second nine weeks.

*Modder River.*

Duration of observation, twelve weeks, November 24th, 1899, to February 16th, 1900.

Early appearance and rapid development.

No similarity to febrile disease curve.

Distinct early maximum and well-marked fall.

Predominant type diarrhœa.

Both dysentery and diarrhœa increasing at end of period.

*Bloemfontein.*

Duration of observation, twenty weeks, March 9th, 1900, to July 27th, 1900.

Oscillation about a high mean level, carried on from the Western line.

No similarity to febrile disease curve.

Predominant type—first half, diarrhœa; second half, dysentery.

Inspection shows that there are three features common to all of these groups, with an exception in the case of Ladysmith. These are:—

(1) The early appearance.

(2) The rapid development (exceptionally in Ladysmith, to a definite maximum).

(3) The absence of any resemblance to the febrile disease curve (except in Ladysmith).

In the Natal Field Army, and the force under Lord Roberts from the end of January, the features are almost identical—in both the rapid development is followed by a comparatively steady mean incidence—that is, there is no tendency for these diseases to attain more than a certain degree of prevalence, nor to a definite epidemic with a distinct decline and fall.

Ladysmith, for reasons which have already been stated in some detail, is in no way comparable with the other two main groups. The permanent occupation of a limited area, the excessive privation and the effects of the siege diet have no parallels elsewhere. These conditions possibly explain the divergent features in the

outbreak there, the tendency to epidemic development, producing a maximum, and similarity to the febrile-disease curve. The garrison of Ladysmith also contained a larger proportion of men who had previously been exposed to dysenteric infection (in India) than either of the other groups, and hence the admissions in the two last probably include a greater proportion of fresh infections than in the former case.

The difference in the predominant disease cannot be taken as of very great importance; so much depends on the matter of diagnosis that the figures are probably subject to considerable errors (see Section D, iii.).

Now these bowel complaints may be taken to include:—

(A) *Non-specific diarrhœas*—i.e., those of which the cause has not been definitely ascertained. These may then be infective or not.

(B) *Specific diarrhœas*: (1) dysenteric, (2) typhoid group.

The recorded admissions for bowel complaints will then include all non-specific diarrhœas, all dysenteric diarrhœas and their consequences—that is, cases diagnosed by their true name, dysentery—and probably all, or nearly all, the typhoid diarrhœas. But they do not include the consequences of infection from a typhoid diarrhœa which do not remain of the same simple type of reaction. Hence, some portion of the diseases under this head passes from observation in the group “Bowel Complaints,” and reappears in the group “Continued Fevers,” so that the growth of the bowel complaints is possibly slightly more of an epidemic character than the bare figures show. But apart from this, which can be but a small element, the aggregate of the non-specific diarrhœa, dysenteric diarrhœa, and dysentery showed a limitation in its development as compared with febrile disease, and tended more to a regular prevalence. The fact that the admissions to hospital represent only a proportion of the bowel complaints actually occurring does not affect this conclusion, as there is no reason to assume that this proportion varies greatly from time to time.

Within the group of bowel complaints dysentery always appeared earlier than diarrhœa—that is, dysentery appeared in the very first week of exposure—and (except at Modder River, where the conditions were unusual) its development became considerable before diarrhœa attained any prominence.

The spread of infective bowel complaints—dysentery—is conditioned by the same circumstances which spread enteric fever. The modes of propagation are, so far as we know, identical;

the source is the same—infective excreta. Now a simultaneous infection of two groups of men, one with dysentery, the other with enteric fever, will, from the difference in the incubation periods, produce obvious cases of dysentery almost at once, while the obvious cases of febrile disease only appear at a later interval, and the development of the contact epidemic from each of these sources will show even greater time differences. So that the early appearance and rapid development of diseases of a dysenteric type are in this way absolutely unconnected with any development of the febrile group. The limited development of bowel complaints, and especially the comparatively early decline of dysentery (if this is, in fact, the case), is not so easy to explain; it may, however, be due to the (usually) shorter acute infective stage, and to the distinct difference in the bacterial content of the excreta, which in dysentery appear to return to the normal condition more rapidly than in enteric fever, where carriers are perhaps rarer, and where dissemination by the urine does not occur. Hence contact infection, both direct and indirect, is more limited in time than in enteric fever.

As to the question of a specific relation between the appearance of diarrhoea and that of enteric fever, only in one case, of the Natal Field Army, do we find any similarity (and that very slight) in the time, relations, and mode of development of diarrhoea and the continued fevers (only twelve cases of *enteric fever* were recorded from this group during the period of observation). But, as has already been pointed out, the distinction between diarrhoea and dysentery cannot be accepted as a basis for close examination of relationships. It is far safer to contrast the whole group "Bowel Complaints" against the "Continued Fevers," and, having done so, we find that, as stated above, excepting in Ladysmith, no similarity existed.

(d) As to the sequence of events in the development of disease in the field, it has been stated that the series is: diarrhoea, non-specific continued fevers, enteric fever—pointing to a development and intensification of the infecting agent on the spot. With our present knowledge of the carriage of pathogenic bacteria by apparently healthy persons, and of the long periods after recovery from enteric fever, during which the bacillus may be carried about and excreted, it seems needless to invoke the doubtful transformation of a non-specific into a specific type to explain the appearance of this disease under conditions which apparently forbid direct infection. In passing, it may be said that, as has been pointed out

in some detail already, the conditions in South Africa were by no means of this nature.

The early development of bowel complaints was apparently not related to the enteric fever outbreaks, and it is by no means necessary that such a preliminary epidemic should occur. It has been said that this preliminary epidemic occurred in some outbreaks at home, but where it has been possible to compare the distribution of the cases of diarrhoea with the dates of *occurrence* of the cases of enteric fever, not the dates of *notification*, it is found that the diarrhoea, in fact, coincided with the enteric fever and did not precede it. Further, there appears to be no reason to assume that the earlier reactions following typhoid infection are always of the type "diarrhoea"; the severity of the reaction is determined by the subject as well as the agent. This hypothetical mild reaction at the beginning would then depend either on a lessened activity of the agent or a greater resistance of the subject. There does not appear to be any evidence that the former condition is by any means invariable, and, although we know the importance of fatigue, exposure, and privation in increasing the susceptibility of the subject, it is hardly probable that this would have any marked effect in the short period which intervenes between the onset of the bowel complaints and the appearance of enteric fever.

There is little evidence of the existence of mild non-specific fevers in the forerunners of enteric fever. No doubt mild fevers do occur—usually returned as simple continued fever—before any prevalence of enteric fever is recorded. Some small proportion of these are probably in fact non-specific, and their existence at this period is accidental, but the most important constituents of this group are almost certainly true cases of enteric fever which have not been diagnosed. This hesitation in the diagnosis of enteric fever at the outset of a campaign, or, in more general terms, at times or in places where enteric fever is not normally prevalent, is a familiar feature. Where and when enteric fever is expected to occur, there and then the simple continued fevers diminish in importance—that is, when enteric fever is prevalent, mild cases are recognized without hesitation which would be passed over at other times. This, and not the essential mildness of the cases, is the reason why the specific diagnosis is not made. Another factor is this: if two cases are infected simultaneously, that which is admitted to hospital the later is the more likely to conform to the usual type of disease. A case admitted on the tenth day is less likely to be passed over than one admitted on the third, and this difference of a week is somewhat

important in the spacing of the epidemic. One is apt to forget that even in Europe the mild, larval, or abortive forms have been recognised for many years (Murchison), and their frequency has also been brought to notice—as by Letulle—who, in 1886, fixed the proportion as 17·4 per cent. of all cases.

(e) One may then conclude that the early bowel complaints are not related to the development of enteric fever, that these diseases are limited in development as compared with the fevers, and that the development of epidemics of enteric fever is of the normal type, from one or more sources of specific infection, and is continuous.

(f) *Some Details regarding the Epidemic in Bloemfontein.*—

(i) Incidence rates cannot be given. The main army arrived in Bloemfontein some 30,000 strong. The force which advanced to Kroonstadt and Pretoria from Bloemfontein and its vicinity amounted to about 42,000 of all ranks. These are the only numerical statements of strength which can be made. The first figures probably represent the greater part of the whole strength in the Free State till about the middle of April, and hence the epidemic of April 13th may be taken to be limited to this group. The last takes no account of the large aggregate of the troops at other points on the line, or scattered over the country. Now the sick in Bloemfontein were drawn directly from the troops in Bloemfontein and the immediate neighbourhood; they were also drawn indirectly from many, if not from all, of the bodies of troops outside the Bloemfontein area, as, for example, at Glen and Vet River on the north, Edenburg and other places on the south, Samua's Post and Thabanchu on the east, and so on. Some of the cases were sent in without coming on record at any hospital, or were, in the absence of any information, so treated—that is to say, they appear in our records as cases originating in Bloemfontein, although the strength to which they belonged was elsewhere. Where cases had come on record at some hospital outside Bloemfontein, and had been transferred there, the number who died are recorded as deaths in Bloemfontein, involving a double error, an increased proportional mortality to cases admitted, and an increased mortality to strength, so that it would not be possible, even if strengths were available, to ascertain with any degree of accuracy the true incidence and mortality during the epidemic. We can, however, obtain a maximum case mortality, as will be shown later. Some idea, however, can be given of the incidence during the first part of the epidemic—up to April 13th—by taking the cases in the main army from the advance into the

Free State—that is, from the week ending February 16th onwards to the maximum. This will give results fairly comparable with those obtained in South Natal and the first fifteen weeks of Ladysmith, although the two latter include portions of the decline in their respective curves. These results are as follows:—

Approximate incidence per 1,000 per annum.

	Enteric	Simple continued fever	All fevers	Dysentery	All bowel complaints
Ladysmith ..	227	133	360	371	401
S. Natal ..	24	149	173	264	312
Main Army ..	167	377	544	72	216

It must again be noted that such annual rates are affected by very large errors; they are, however, necessary for comparative purposes, and are useful if the comparison is not pushed too far into detail.

Two things are evident—that the main army up to this period suffered less from bowel complaints and certainly from dysentery, than the other groups. Further, in the main army, the proportion of mild continued fevers was greater than in the others. Reasons have been given for believing that some part of this incidence may have been due to mild fevers not of the typhoid group, and this must be remembered in comparing these rough incidence rates. But in any case the incidence in the main army up to this time was exceptionally high.

Attention may again be called to the downward tendency of the curve from April 13th (fig. 7), notwithstanding the sudden increase on the two occasions mentioned. This suggests an exhaustion of the susceptible population in spite of the reinforcements which arrived in Bloemfontein during the period, many of them direct from England. One may conclude from experience elsewhere—in India and South Africa—that the more susceptible of these were infected at once and went to swell the numbers; the less susceptible escaped for the time, and formed the material for the epidemic at Kroonstadt, after its occupation, and elsewhere.

(ii.) The total number of cases of all kinds admitted to hospital in Bloemfontein during the twenty weeks March 16th to July 27th was 17,141, of which 8,568 were cases of continued fever, 2,121 cases of bowel complaints—that is 50 per cent. and 12 per cent. respectively, of the total number. The average weekly number remaining in hospital was 2,629, of whom 1,054 were cases of continued fever.

The effect of the variations in the number of troops in or near Bloemfontein on the continued fever curve may be gauged by

plotting out the numbers admitted to hospital for other causes than the two groups specially considered, continued fevers and bowel complaints. This shows very little correspondence with the fever curve; the only definite resemblance is in the rise immediately after our arrival. Maxima occur on April 6th and 20th, May 4th and June 8th. There is a considerable fall from May 4th, rising again slightly to the maximum of June 8th, from which date there is a sharp fall to the 15th, a slight rise to the 29th, and then a steady fall. Thus, on the whole, the numbers admitted were steadily increasing up to May 4th, from which date they fell in two stages. Probably, then, the increase of troops in and around Bloemfontein partially determined the fever maximum of May 18th, but not the other two maxima.

(iii.) *The Case Mortality for Enteric and all Continued Fevers.*—These may be regarded in two ways, first as absolute figures, and secondly, as a means of comparison of the severity (of which the case mortality is a useful index) among the four groups that are available for this purpose.

The absolute case mortality shows 961 deaths among 4,959 cases of enteric fever *admitted* to hospital—*i.e.*, 19·38 per cent.—and 964 deaths among 8,568 cases of all continued fevers *admitted* to hospital—*i.e.*, 11·25 per cent. But these relations of deaths to cases do not convey an accurate impression of the actual facts; cases were *transferred* to the Bloemfontein hospitals without being included among the admissions, and, on the other hand, some (not many) deaths occurred among the cases transferred from Bloemfontein to other stations. These two sources of error do not balance one another. There is no question that the deaths among the cases transferred to Bloemfontein were greater in number than among the cases sent out of Bloemfontein, first because of the larger number sent into the town in the acute stage, and secondly, because of their greater severity. Cases were sent in from the surrounding district as a matter of necessity; cases sent out were at least fit to be moved. Hence this case mortality of 19·38 per cent. is a maximum rate, and is by no means high compared with those found elsewhere.

The second use of the case mortalities is not open to the same doubt as to accuracy; each of the groups compared was under the same average conditions. We have two main groups, Colonial troops, and those for brevity called Regulars, which included some Volunteers and Imperial Yeomanry. Each of these two groups is divided into the sub-groups, officers and men. The following table

shows the case mortalities in each of these groups, with the probable errors and differences, for enteric fever and for all continued fevers. The general case mortality in the corresponding groups for the whole period of the campaign is also shown in dark type for comparison.

COMPARATIVE CASE MORTALITIES IN BLOEMFONTEIN.

	ENTERIC FEVER			ALL CONTINUED FEVERS		
	Regulars	Colonials	Totals	Regulars	Colonials	Totals
Officers—						
Bfn. ..	12.58 ± 1.82	10.64 ± 3.03	12.12 ± 1.56	7.98 ± 1.19	8.62 ± 2.49	8.11 ± 1.07
<b>S.A.W. ..</b>	<b>9.73 ± 0.47</b>	<b>11.19 ± 1.30</b>	<b>9.92 ± 0.44</b>	<b>6.09 ± 0.30</b>	<b>7.35 ± 0.87</b>	<b>6.24 ± 0.28</b>
	2.85 1.88	0.55 5.30	2.20 1.62	1.89 1.23	1.27 2.64	1.87 1.10
Men—						
Bfn. ..	20.37 ± 0.42	13.68 ± 1.05	19.68 ± 0.39	11.76 ± 0.25	7.86 ± 0.62	11.36 ± 0.24
<b>S.A.W. ..</b>	<b>14.28 ± 0.10</b>	<b>11.33 ± 0.25</b>	<b>13.91 ± 0.10</b>	<b>9.07 ± 0.07</b>	<b>7.46 ± 0.17</b>	<b>8.87 ± 0.06</b>
	6.09 0.43	2.35 1.08	5.77 0.40	2.69 0.26	0.40 0.64	2.49 0.25
	+	-	+	+	-	+
COMPARATIVE RATES BETWEEN OFFICERS AND MEN—BLOEMFONTEIN ALONE.						
Officers ..	12.58 ± 1.82	10.64 ± 3.03	12.12 ± 1.56	7.98 ± 1.19	8.62 ± 2.49	8.11 ± 1.07
Men ..	20.37 ± 0.42	13.68 ± 1.05	19.68 ± 0.39	11.76 ± 0.25	7.86 ± 0.62	11.36 ± 0.24
	7.79 1.87	3.04 3.21	7.56 1.61	3.78 1.22	0.76 2.56	3.25 1.09
	+	-	+	+	-	+

The table may be summarised as follows: (1) There is really only one difference—between the Warrant and N.C.O.'s and men of the "Regulars" as here used, and the other sub-groups. The first shows a distinctly higher case mortality than the second, among whose components no significant difference exists. This distinction applies to enteric fever and to the total of all continued fevers, both in the epidemic in Bloemfontein and in the results of the whole campaign. It may be safely accepted as a true distinction. The grouping in the case of Bloemfontein is this:—

	Enteric fever		All continued fevers
Regular forces, excluding officers ..	20.37 ± 0.42	.. ..	11.76 ± 0.25
	and		
Officers, regulars .. ..	12.58 ± 1.82	3.69 .. ..	7.98 ± 1.19
„ colonials .. ..	10.64 ± 3.03		8.62 ± 2.49
Men, colonials .. ..	13.68 ± 1.05		7.86 ± 0.62
			2.83

It may be pointed out, in relation to these comparative case mortalities, that the proportion of the total continued fevers which

were diagnosed enteric fever was substantially the same in Bloemfontein and throughout the whole campaign, about 60 per cent., except in the case of the Colonial officers in Bloemfontein, where it rose to 81 per cent.

(2) Among the officers the case mortality in Bloemfontein did not show any significant variation from that obtaining over the whole campaign. Among the men of the Regulars it was higher in Bloemfontein than during the whole campaign, both for enteric fever and all continued fevers. Among the men of the Colonials, it did not differ from that of the whole campaign.

(3) The case mortality from enteric fever and from all continued fevers was then greater among the men of the Regulars than among any other group, and greater than the average of the same group over the whole campaign.

Messrs. Holt and Schooling in pointing out that the death-rate from other causes than wounds was invariably higher among the men than among the officers, say that "it is probable that as a body, they (the officers) were men of better stamina than the rank and file, and perhaps were better cared for when ill" ("The Mortality Experience of the Imperial Forces in South Africa," p. 20. It should be noted that this conclusion is drawn from the bare ratios without consideration of probable errors or differences). Here we have two propositions, which are perhaps generally accepted; the latter, indeed, has been put more bluntly. But the fact that the case mortality among the men of the Colonials shows no significant variation from that in the two groups of officers shows that the cause must be sought elsewhere than in the treatment, as at no time was there any differentiation in treatment between the Colonial and Regular rank and file. The Colonial troops in Bloemfontein, and indeed during the whole area of operations during the early part of the war, were men of good physique; later on the same adjective could not be applied to the whole group.

The differences in exposure between officer and man in the advance to Bloemfontein and its early occupation can have been very small, at least for the regimental officer; in Bloemfontein one was as likely to be attacked as the other, and it will be seen later that over the whole campaign, the officers of the Regulars and Volunteers were attacked rather more frequently than the men of the same group.

We have then, among the group of lesser mortality, two conditions: "better stamina"—that is the result of antecedent differences in nurture, better feeding during childhood and adolescence,

the habit of exercise instead of the overwork of the undeveloped youth of the labouring classes, and a habit of cleanliness in person and with regard to food, which in some degree withstood the temptation to revert to primitive savagery.

Among the Colonial troops, we have probably greater average age, the habit of life in some degree analagous to field service, and the lessened susceptibility due to previous exposure and infection. The difference in mortality then is explainable by reference to conditions which long preceded the actual attack of the disease.

(g) *The Later Prevalence of Enteric Fever and Dysentery.*—

(a) From the date of our occupation of Bloemfontein, the conditions in the area of operations became more and more complicated as time went on. There were, in the first place, the lengthening lines of communication, liable to be broken at any point and consequently guarded by small bodies of troops at every station and almost at every culvert. The medical arrangements on these lines have been described in the Report on the Medical Arrangements in South Africa. There were the large garrisons of important points on and off the line: Bloemfontein, Kroonstadt, Johannesburg, Pretoria, Standerton—all permanently important as the centres from which the columns started and to which they returned for refitting. Besides these, smaller garrisons were maintained at other points of less permanent importance, such as Harrismith, Machadodorp, Potchefstroom, and other places, depending on the area in which the mass of the columns was operating. Next came the smaller garrisons of posts off the railway line, not continuously occupied and only occasionally important; next the chains of blockhouses extending along the railway line or from point to point across country, and last of all the columns themselves, working in various parts of the area, remaining out for variable periods, but finally coming to the line somewhere to obtain supplies and refit. It is quite evident that it is absolutely impossible to examine the prevalence of these two diseases in any detail under such complicated conditions; the sick population of a hospital was drawn from a very wide area, an area, too, which differed to some extent from week to week according to the direction from which the columns came.

On the other hand, there is little to be gained from an inquiry into the mode of propagation under these conditions. From about the date of the occupation of Bloemfontein, enteric fever and dysentery occurred in varying degrees of intensity throughout the whole area for the remainder of the campaign. It is safe to say that no known means of dissemination, except drains, oysters, and fried fish,

was wanting. Numerous specific instances of sanitary mistakes or apparent neglect have been published in the medical press and elsewhere, during and after the campaign, which no doubt exemplified the possible modes of dissemination which existed, but they rarely, if ever, correlated the supposed antecedent cause and the consequent case, and never revealed any new method of infection. Hence there appears to be little benefit in discussing them. Further, it is probably not unjust to say that in certain of these examples the scientific interest was not the motive which determined publication : in one instance, indeed, an illustrative map was (one can only suppose inadvertently) lettered and printed upside down, which made a very material difference in the lesson to be drawn from it—the relation of a water intake to a sewage outfall. These examples revealed one thing—the necessity of a much more complete knowledge of details than was possessed by the authors, in order to understand the true meaning of the facts as they appeared.

One has only to read the reports of the Local Government Board to recognise the very great difficulty in tracing the mechanism of infection under the comparatively simple conditions of an almost stable population and environment. How much more difficult the investigation then must be when the population is essentially mobile, the conditions varying from day to day, when also, except at once and on the spot, it is almost impossible to make any satisfactory attempt at the reconstitution of the case.

Among the various accounts of the occurrence of enteric fever and dysentery in South Africa which have been published, that by Dr. H. H. Tooth, C.M.G., of the Portland Hospital, may be specially mentioned as a careful statement of the position. Further, that portion of the Report of the Commission on Enteric Fever and Dysentery, by Colonel J. Lane Notter and Professor W. J. Simpson, contains much interesting information in this connection. This report, however, is more likely to be of use to those who have practical knowledge of the conditions met with in the field in war time than to others.

*(To be continued.)*

## THE SERUM DIAGNOSIS OF SYPHILIS.

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*(Continued from p. 602, vol. xiv.)*

BEFORE discussing the occurrence of the Wassermann reaction in syphilis and its bearing on the diagnosis and treatment of the disease, it will be convenient to mention more particularly the technique by which the reaction is obtained. For this purpose I propose to describe: (1) The more usual methods of obtaining the constituents of the test; (2) the method of arriving at an estimate of the amounts of each of the constituents to be used; (3) the manner of conducting the test; and (4) the reading of the results.

"Antigen" or extract is prepared in many different ways. The original method was to grind up one part of the liver of a syphilitic infant with four parts of salt solution (0·9 per cent.), containing 0·5 per cent. carbolic acid. The mixture was kept for twenty-four hours in a bottle, being frequently shaken in the meantime, and then gently centrifuged or, preferably, decanted.

Levaditi<sup>12</sup> grinds up the liver of a syphilitic or normal new-born infant with the least possible quantity of salt solution (0·8 per cent.) and dries the mixture *in vacuo* over sulphuric acid. He prepares the extract for use by adding one part of the dry powder, which results from the desiccation, to 30 parts of salt solution, and leaves the two in contact for twenty hours on ice, then centrifuging to obtain the clear liquid which is used for the test.

Bruck<sup>13</sup> recommends that the extract be prepared according to Levaditi's method, then dried *in vacuo*, and the resulting powder sealed up in fused tubes in quantities of 0·1 gm. He states that the powder thus kept retains its properties indefinitely in the tropics. When required for the test, 0·1 gm. of the powder is dissolved in 1 cc. distilled water.

Watery extracts are very uncertain, and are apt to diminish in power somewhat rapidly, so that it is probably more usual to use alcoholic extracts of solid syphilitic or normal organs, which retain their power for long periods.

<sup>12</sup> Levaditi et Roché, "La Syphilis," pp. 390-391.

<sup>13</sup> Bruck, "Die Serodiagnose der Syphilis," p. 22.

Opinions regarding the respective merits of alcoholic extracts of syphilitic and of normal organs on the one hand, and of extracts of the different normal organs which are used, on the other, differ very greatly. It is probably true that the differences arise, not so much from experience of the different types of organ used, but of the different specimens of the same type of organ which happen to have been chosen. At any rate, out of three extracts of syphilitic liver which I prepared under apparently identical conditions, there is one which, under all the tests by which extract is judged, is considerably superior to either of the other two.

The organs which are commonly used are: liver of syphilitic infant, normal infant's liver, guinea-pig's heart, guinea-pig's liver, rabbit's heart, human heart, and ox heart. Many others might be mentioned, but these are most commonly available.

The following are the more common methods of preparing alcoholic extracts from these organs:—

(1) The organ is cut up very finely and mixed with absolute alcohol in the proportion of one of organ to nine of alcohol. The mixture is shaken in a shaking machine along with glass beads for twenty-four hours, and is then filtered through ordinary filter-paper.<sup>44</sup>

(2) The organ is minced very finely, and then ground up in a mortar together with broken glass, while alcohol is added little by little till the proportion is one of organ to five of alcohol. The mixture is then transferred to a water bath at 60° C. for two hours and kept at room temperature for twenty-four hours, after which it is decanted.<sup>45</sup>

(3) I have adopted the following method, which appears to yield excellent extracts: The organ is finely minced and ground up with broken glass in a mortar, 96 per cent. alcohol being gradually added till the proportion is one of organ to four of alcohol. The mixture is then transferred to a bottle and placed in the incubator for three days at 37° C., kept at room temperature for three more days, and then filtered through ordinary filter-paper. After filtration it is kept in the ice-chest for a week; during this time a fine deposit settles, which should be left undisturbed. However prepared, the filtrate should be quite clear.

*Complement.*—Guinea-pig blood-serum is used for the most part by those who adhere to the principle of the original Wassermann

<sup>44</sup> Bruck, *ibid.*, p. 22.

<sup>45</sup> Sabrazes and Eckenstein, *Lancet*, January 22nd, 1910, pp. 232-234.

reaction. It may be obtained by anæsthetising the animal, and, having removed the skin and subcutaneous tissue from the front of the chest, pushing the point of a large-chambered pipette into the right heart. The blood is sucked up into the chamber of the pipette till no more can be obtained in this way. The chest is then opened, and as much blood as possible obtained from the cavity after removing the heart and lungs.

This method entails the sacrifice of a guinea-pig every time that a batch of tests has to be carried out. I think that, on the whole, it is unnecessary, particularly if smaller quantities of the reagents are used for the test, as will be mentioned later. It is possible to obtain 3 cc. to 4 cc. blood from the ear of a guinea-pig without the animal showing the least sign of distress, and I have generally obtained the blood in this way. The ear is well rubbed with wool soaked in alcohol, and then dried, when it will be seen that a number of small vessels converge towards the margin. The ear is folded together, and, with a sharp pair of scissors, a shallow V-shaped portion snipped off so as to include a few of the vessels. The blood is collected in capsules.

Guinea-pig blood-serum must be quite fresh to give consistent results, and should certainly not be used when more than twenty-four hours old. I prefer to use it when four to five hours old.

To obviate the inconvenience which arises from the rapid deterioration of complement with age, Noguchi<sup>46</sup> recommends that the fresh guinea-pig serum be dried rapidly on blotting-paper in a current of air. I have no experience of this, but Bayly<sup>47</sup> has found it a useful means of preserving its power.

*The serum to be examined* is obtained either from the finger or lobe of the ear, when it is collected into capsules, or by puncture of a vein. I prefer the latter method, which is really less painful and considerably more rapid. The arm is dried at the bend of the elbow with wool, and, with a camel-hair brush, a mixture of one part iodine in fifteen chloroform painted on a prominent vein to sterilise the skin. The upper arm is constricted, and a sharp hollow needle, such as is supplied with an antitoxin syringe, run into the vein, keeping the eye of the needle up and the needle itself almost parallel with the skin surface. The blood is received into a test-tube and, when sufficient has been drawn off (10 cc. or less), the needle is removed, an antiseptic swab being immediately applied

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<sup>46</sup> Noguchi, *Journ. of Exp. Med.*, vol. xi., 1909, p. 392.

<sup>47</sup> Bayly, *Lancet*, May 7th, 1910.

and bandaged firmly on to avoid the formation of a hæmatoma. The test-tube containing the blood is put into the incubator for an hour or so, and when the clot has contracted well, the clear serum is drawn off. It is much better to obtain serum in this way when it has to be sent through the post, as when the serum is left in contact with the clot the jolting causes it to become heavily tinged with red, and this makes the reaction very difficult to read.

Human serum, like all other, when fresh contains a certain amount of complement, and to avoid the inaccuracy which might result from the introduction of an unknown amount of complement in addition to that which is added in the shape of guinea-pig serum, the original technique provides for the removal of this natural complement by heat. Sachs and Altmann,<sup>48</sup> however, showed that by heating, every serum loses its deviating power very considerably, and Noguchi<sup>49</sup> estimates this loss at from 50 per cent. to 75 per cent. If a *normal* unheated serum be put up in the same amount and with the same quantities of extract and complement as are used for testing heated serum, it will frequently be found that deviation of complement occurs in spite of the fact that the tubes contain not only the standard amount of guinea-pig complement but natural complement as well. Apparently this does not occur with some extracts, because I tested a considerable number of unheated normal sera with one extract, using the same proportions as are used in the original method, and found that they gave uniformly negative reactions. With a new extract, however, a succession of normal sera deviated large quantities of complement, so that I was compelled to reduce the amounts of serum and of extract respectively, while retaining the same amounts of complement. On account of the diminution in deviating power which occurs from heating at 55° C., it has been suggested that unheated serum be used while otherwise following the original Wassermann technique,<sup>50</sup> but, so far, I have been unable to find a combination which, while retaining its reliability (uniformly negative results with normal sera), is as delicate as the reaction which results when the serum is heated for no longer than is necessary to deprive it of complement.

As the presence of varying amounts of natural complement introduces an uncertain factor into the test, I made a number of

<sup>48</sup> Sachs u. Altmann, *loc. cit.*

<sup>49</sup> Noguchi, *Journ. Amer. Med. Assoc.*, 1909, vol. liii., p. 1533.

<sup>50</sup> McDonagh, Müller and Morawetz, *Practitioner*, September, 1909, pp. 307-326.

experiments, first to ascertain the time it takes to deprive a serum of its natural complement when heated at  $55^{\circ}$  C., and next to test the difference in deviating power between the same sera heated for the minimum time, and for half and one hour respectively at  $55^{\circ}$  C., I found that after heating for ten minutes the serum lost its complement power for hæmolytic amboceptor. Comparison between the deviating power of the same sera after heating for ten, thirty, and sixty minutes respectively showed that while in florid cases of syphilis no great difference was apparent with the amounts of complement I used, in well-treated latent cases a considerably higher proportion of positive results occurred with sera which had been heated for ten minutes only than with the same sera heated for thirty and sixty minutes respectively. I have therefore definitely abandoned heating for thirty minutes, and now inactivate the serum by heating for ten minutes only.

With regard to the use of unheated serum, one might of course allow the serum to stand till the natural complement died away with age, but I do not think this desirable, as other factors intervene (changes in deviating power), and it is also sometimes inconvenient to wait for the number of days necessary to allow the complement to die out before conducting the test.

The hæmolytic system which is used as the reagent to test for free complement is obtained as follows: Workers, for the most part, use sheep-cells and anti-sheep-cells serum. The latter is obtained by injecting a rabbit at intervals of eight days with sheep blood-cells which have been freed from serum by repeated centrifuging and resuspending in salt solution (0.9 per cent.). The injection may be made either into a vein, in which case 1 cc. of cells with 2 cc. of salt solution is injected into the marginal vein of the ear; or intra-peritoneally, when increasing doses of the cells are injected, commencing with 5 cc. and increasing up to 10 to 20 cc. After four or five injections, the rabbit's serum will be found to be strongly hæmolytic for sheep blood-cells, and eight days after the last injection the animal should be anæsthetised and bled in the manner first mentioned for obtaining guinea-pig blood. It is necessary that rigid aseptic precautions be taken in this operation, and when the serum has separated it should be drawn off into sterile capsules or ampoules, and heated at  $55^{\circ}$  C. for half an hour to destroy its complement. If aseptic and kept in an ice-chest, it will retain its power for many months.

Sheep blood-cells are obtained from the slaughter-house. The blood is received into a bottle containing a number of glass beads,

and at once well shaken to remove the fibrin. If aseptic, it will keep on ice for five days. The cells are prepared for the test by centrifuging and resuspending the deposit in salt solution (0.9 per cent.) at least three times.

One part of the deposited cells is then taken and mixed with nineteen parts of salt solution so as to make the 5 per cent. suspension.

The actual amount of each of the above constituents which is used for the test varies with different workers, but the proportion which each bears to the others is fixed on certain definite principles which vary very little.

For the most part, workers base the actual amount on proportions of one cubic centimetre; *e.g.*, a very common formula is the following:—

Patient's heated serum	..	..	..	0.2 cc.
Extract ..	..	..	..	0.2 „
Complement ..	..	..	..	0.1 „

Incubate for one hour at 37° C.

Add of sensitised sheep-cells (5 per cent. suspension) 1 cc.

Incubate for  $\frac{1}{2}$  to 1 hour at 37° C.

It will be seen that to examine 30 blood sera when using the above amounts would require 6 cc. of extract and 3 cc. of guinea-pig serum. Besides this at least 4 cc. of guinea-pig serum as additional complement for the minimum number of controls and 0.4 cc. patient's serum would be required; consequently when conducted on this scale the test becomes beset with difficulties, not the least of which is the expenditure of guinea-pigs.

Some works economise material by using drops, but if anyone will take the trouble to count the number of drops by which he can deliver a given amount of fluid from a dozen different pipettes he will realise that such a method must be highly inaccurate. For these reasons I have from the first based my amounts on proportions of one volume and, purely for convenience in manufacturing the pipettes, have fixed the volume at 0.1 cc. On this principle, the above example of a formula would read as follows:—

Patient's heated serum, 1 in 5 dilution	..	1 volume
Extract, 1 in 5 dilution ..	..	1 „
Complement, 1 in 10 dilution ..	..	1 „

Incubate for 1 hour at 37° C.

Add of sensitised sheep-cells (5 per cent. suspension) 1 volume.

Incubate for  $\frac{1}{2}$  to 1 hour at 37° C.

I keep a supply of from thirty to forty pipettes, each of which is graduated with one mark to 0.1 cc., and three or four similarly

graduated to 0.4 cc., and in making dilutions of serum first deliver 0.4 cc. salt solution with a larger pipette into a watch-glass and then, with a smaller sized pipette, add to it 0.1 cc. of serum. The resulting 1 in 5 dilution is well mixed with the 0.1 cc. pipette, which is then used to deliver the amounts of the diluted serum into the test-tubes. Having measured the particular serum into the tubes apportioned to it, the pipette is laid aside and not used again till it has been cleaned with distilled water and dried with alcohol followed by ether. Another pipette is taken for the next serum and so on.

The pipettes are very easily made by graduating with mercury and each is carefully tested by measuring twenty volumes with it into a burette graduated to 0.1 cc.

Dilution of the extract is a matter of great importance. Sachs and Rondoni<sup>51</sup> first showed that if alcoholic extract be thrown in bulk into salt solution, the result is a fairly clear liquid with considerably less deviating power than the cloudy emulsion which results when the salt solution is added to the extract slowly, drop by drop, and with continual shaking. On this account it is highly important that the extract be diluted as uniformly as possible, and sufficient of the diluted extract should be prepared for the whole batch of tests.

It appears that the more turbid the diluted extract the better its deviating powers. At first, I used the method advocated by Sachs and Rondoni, but have since adopted the following plan, recommended by Browning and M'Kenzie,<sup>52</sup> which produces a very turbid emulsion. Four volumes of salt solution are run into a test-tube and on the top of the solution one volume of the extract is run in the same manner that urine is run on to nitric acid in testing for albumin. I do this before anything else, and then put the test-tube to one side while the sera are being measured out for the tests. A cloudy ring forms which thickens with standing, and the test-tube is slowly rolled between the hands, just as deposit is shaken up from the bottom of a broth culture. The cloud slowly diffuses through the mixture, and when the emulsion is fairly even the tube is inverted once or twice to complete the mixing.

It is necessary to ascertain the strengths of the various reagents in order that the proportion which each should bear to the others may be gauged.

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<sup>51</sup> Sachs u. Rondoni, *Berlin. klin. Woch.*, 1908, S. 1968.

<sup>52</sup> Carl Browning and Ivy M'Kenzie, *Journal of Pathology*, January, 1909.

In the case of alcoholic extract and hæmolytic amboceptor, the titration of their respective values need only be done occasionally, though Bruck<sup>53</sup> and Stern<sup>54</sup> consider that amboceptor should be titrated previously to each test, with a given amount of complement, in order that the dose of the former may be fixed to suit the variations which they find occur in different guinea-pigs' sera as regards their complement content. As I use a large amount of amboceptor to sensitise the sheep-cells, and never use complement which is more than twenty-four hours old, I have not found the variations in the complement value of guinea-pig serum to be so marked as these workers mention.

The minimum hæmolytic dose of amboceptor is found in the following way: Into each of a series of small test-tubes (1 cm. by 5 cm.) is measured one volume of the 5 per cent. suspension of sheep-cells and to each is added one volume of the rabbit's anti-sheep-cell serum in varying dilutions, *e.g.*, 1 in 100, 1 in 400, 1 in 800, 1 in 1,000, 1 in 1,500, 1 in 2,000, and 1 in 3,000, and to a last tube is added one volume of salt solution. The tubes are marked to indicate the amount of amboceptor in each, and should stand for twenty to thirty minutes. At the end of this time, one volume of a 1 in 10 dilution of fresh guinea-pig serum (complement) is added to every tube, the tubes are put into the incubator for an hour and read at the end of that time. With the amboceptor which I am at present using I find that the tubes to which one volume of 1 in 1,000 amboceptor and lower dilutions have been added show complete lysis, and accordingly fix 1 in 1,000 as the minimum dose of my amboceptor. I take the reading after one hour's incubation instead of after further standing at room temperature or on ice for sixteen to twenty-four hours, because tubes containing less than the minimum hæmolytic dose of amboceptor would show complete lysis after the longer period, as pointed out by Muir.<sup>55</sup>

In preparing sensitised cells, I add five to six doses of amboceptor, *i.e.*, in the present case 0.1 cc. amboceptor to 20 cc. 5 per cent. suspension of cells. Other workers add two doses, while Bruck<sup>56</sup> and Stern<sup>57</sup> add three to four. I purposely standardise on excess of added amboceptor because human serum contains natural anti-sheep-cell amboceptor in amounts which may vary, and it has been

<sup>53</sup> Bruck, *loc. cit.*, p. 23.

<sup>54</sup> Stern, *Berlin klin. Woch.*, 1908, p. 1489.

<sup>55</sup> Muir, "Studies on Immunity."

<sup>56</sup> Bruck, *loc. cit.*      <sup>57</sup> Stern, *loc. cit.*

urged that in conducting the test on a serum which is weak in deviating power but strong in natural amboceptor, the latter may cause hæmolysis to occur with the trace of complement which may be left free after incubation.<sup>38</sup> With an excess of added amboceptor, the addition of such varying amounts of natural amboceptor as may occur in the tested serum appears to make no difference in my experience. Naturally if any complement remained unabsorbed after the first incubation, excess of amboceptor would demonstrate it much more easily; but I consider this an advantage, as it makes for safety to count only on *complete* deviation of complement.

I fix the dose of extract as follows: Four human sera, two normal and two syphilitic, are taken and heated at 55° C. for ten minutes. The sera are marked A and B (normal) and C and D (syphilitic) respectively. Four rows of eight tubes each are set out; into each of the first row is put 0·1 cc. of a 1 in 5 dilution of A serum; into each tube of the second row, 0·1 cc. of a 1 in 5 dilution of B serum; and into the tubes in the third and fourth rows, C and D sera respectively in the same quantity.

Into every tube is put 0·1 cc. of a 1 in 10 dilution of fresh guinea-pig serum (complement), and into a corresponding tube of each row, one volume of a definite dilution of extract, *e.g.* :—

No. 1	tube of each row	receives	0·1 cc. of	1 in	3	extract.
No. 2	„	„	„	„	1 in	4 „
No. 3	„	„	„	„	1 in	5 „
No. 4	„	„	„	„	1 in	8 „
No. 5	„	„	„	„	1 in	10 „
No. 6	„	„	„	„	1 in	20 „
No. 7	„	„	„	„	1 in	30 „
No. 8	„	„	„	„	1 in	40 „

Each tube is marked to indicate the dilution of extract it contains, and, after shaking, all are placed in the incubator at 37° C. for an hour. At the end of this time the tubes are removed, to each is added 0·1 cc. sensitised cells (5 per cent. suspension), they are then replaced in the incubator for another hour, after which time they are removed and read. In the two rows containing the syphilitic sera, hæmolysis may have occurred only in the tubes containing high dilutions of the extract, *e.g.*, 1 in 30 or 1 in 40, while in the rows containing normal serum most of the tubes will show hæmolysis. The results as regards this vary with different extracts. A good extract would be one which showed no hæmolysis in the syphilitic serum tube in any less dilution than 1 in 40, while in the

<sup>38</sup> Noguchi, *Journ. Exp. Med.*, 1909, vol. xi., pp. 392-401.

case of the normal serum tubes showing hæmolysis in those containing 1 in 3 extract and weaker dilutions. A poor extract, on the other hand, would show lysis in the syphilitic serum tubes containing a 1 in 8 dilution of the extract and no lysis in the normal serum tubes containing dilutions of 1 in 4 and stronger. Such an extract would leave little margin for safety.

In choosing the syphilitic sera for the preliminary test of extract, I try to select one from a florid case and one from a well-treated case. The preliminary titre frequently shows that in the tubes containing the serum of the florid case no lysis occurs in that containing one volume of the 1 in 40 extract (and less dilutions), while those containing the serum of the well-treated case show lysis in all the tubes save those containing one volume of 1 in 8 extract and higher concentrations.

The dose of extract is fixed provisionally from this initial test; if lysis occurs in every tube containing normal serum, I fix a 1 in 5 dilution as the strength to adopt at first in testing the extract further. Every new extract is tested in the dose fixed in this manner, together with another accredited extract, on at least twenty syphilitic and as many normal sera as can be secured (not less than ten) before being taken into use.

The preparation which I am at present using is an alcoholic extract of a syphilitic infant's liver. In the preliminary titre it showed deviation with the serum of a florid case of syphilis when used in a 1 in 40 dilution, and no deviation with a normal serum when in a 1 in 3 dilution. The dose was fixed as a preliminary measure at one volume of a 1 in 5 dilution, and after a few hundred tests has not been changed.

The complement should be titrated each time to see that it is sufficiently active. I find that, with the amount of amboceptor used one volume of a 1 in 80 to 1 in 100 dilution is sufficient to hæmolyse completely one volume of the 5 per cent. suspension of cells in an hour. The amount of complement used in following the original Wassermann technique is usually 0.1 cc. (see first formula). In the method which I have adopted this is equivalent to one volume of a 1 in 10 dilution, and the latter is the amount which I use as the standard. In addition to this amount, I have, from the first, used a double quantity of complement (one volume of a 1 in 5 dilution) as suggested by M'Kenzie,<sup>39</sup> in the hope of obtaining thereby a roughly quantitative estimate of the deviating power of a patient's

serum and of testing the influence of treatment. The results obtained by this estimate are noted in the table showing the percentages of positive reactions which have occurred after varying numbers of courses of treatment.

Having now described the manner in which the quantities are fixed, it remains only to show how the test is put up and read. I set out the small test tubes (1 cm. by 5 cm.) in three rows on a rack made by drilling holes into a block of wood. The test-tubes are therefore in sets of three, those of each set being one behind the other; and each set is devoted to one serum. Each serum is diluted in the manner described and delivered with a separate 0.1 cc. pipette into the tube apportioned to it. Into each tube of the first set of three is put 0.1 cc. of 1 in 5 normal serum. Into each of the next set of three the same quantity of similarly diluted serum from a case of florid syphilis, or one which is known to give the reaction, and each of the remaining sets receives the same quantity of the serum to be tested for the reaction. At the end is placed a solitary tube into which no human serum is put.

Into each tube in the front two rows, and into the solitary tube at the end, is put 0.1 cc. of a 1 in 5 dilution of the extract.

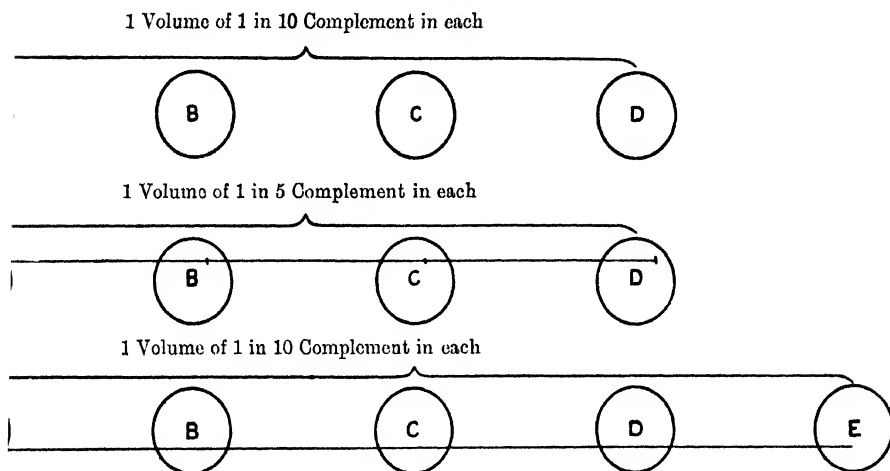
Into each of the front and back row tubes, and into the solitary tube at the end, is put 0.1 cc. of a 1 in 10 dilution of complement, and into each of the middle row, 0.1 cc. of 1 in 5 complement (*i.e.*, double the standard amount).

The two front rows, therefore, differ from the back in containing extract. The back row is designed to show that each serum will not deviate the complement in the absence of extract. In the final reading, therefore, every tube in the back row should show hæmolysis.

The solitary tube differs from all the others in containing no human serum. Its purpose is to show that the extract, in the strength used, has not the power of itself of inhibiting the action of the complement. In this tube also hæmolysis should be complete at the end of the experiment. The middle differs from the front row in containing twice the amount of complement placed in each of the other tubes. It is intended to demonstrate differences in the deviating power of those sera which give a positive reaction. 0.1 cc. salt solution (0.9 per cent.) is then added to each tube in the back row and to the solitary tube, so as to make the amounts in each of the tubes equal.

Seen in plan, the rack of tubes presents the following arrangement: A tubes contain normal, B tubes syphilitic, C and D patients'

sera to be tested, and E tube no human serum. Each tube in the two front rows contains 1 volume of 1 in 5 extract.



The tubes are then shaken, and the rack is placed in the incubator at 37° C. for an hour, for absorption of complement to occur in the case of the positively acting sera. The period of incubation varies with different workers. Some give as short as half an hour, while others do not remove the tubes for four or five hours. I have tested a few sera with the object of ascertaining how long it takes for the complement to become bound when in contact with syphilitic serum and extract. A dozen specimens of serum were each divided into three portions; each portion was put up with extract and complement in the manner shown above, and incubated for thirty, sixty and ninety minutes respectively. The result showed that in the case of the syphilitic sera included in the series the complement was bound as completely in thirty as in ninety minutes. In another series, the three portions of each serum were incubated with extract and complement for fifteen, thirty, and sixty minutes respectively. In this case, some of the positively acting sera did not bind the complement so well in fifteen minutes as when left to incubate for thirty or sixty minutes. It would be necessary to conduct a large number of experiments on these lines before it would be possible to lay down a minimum time which could be allowed for incubation to ensure complement absorption in *any* positively acting serum, and as the longer period does not appear to cause destruction of complement in the normal serum

tubes, I have adopted one hour as the time for the preliminary incubation in routine examinations. At the end of the hour's incubation, the tubes are removed and to each is added 0.1 cc. of the 5 per cent. suspension of sensitised cells; the tubes are then shaken and replaced in the incubator.

They are examined at intervals of ten minutes and shaken to break up any clumps of cells which may have formed on account of agglutinins in the amboceptor serum. When the normal serum tubes show complete hæmolysis the rack is removed and the results noted. They are then allowed to stand at room temperature for an hour, and the results finally recorded. I think that if left till next day before the final reading is taken, fallacies are apt to occur from the fact that though complete absorption of complement may have occurred in certain tubes, as shown by no lysis having been apparent after standing for one hour at room temperature, considerable lysis may be shown at the end of sixteen hours. This has been observed by many workers, and is generally attributed to the action of the alcoholic extract, which has a hæmolytic action by virtue of containing lipoids. Either the extract becomes partly dissociated from the combination, or is not completely bound in the first instance, and the dissociated or unbound portion acts on the cells and slowly hæmolyses them. In reading the results the following principles are observed. Failure to hæmolysise in the tubes containing normal serum and in that containing extract and complement only entails rejection of the whole experiment. Failure of any back row tube (serum and complement only) to hæmolysise entails no record for that serum till it has been retested.

Any lysis in a front row tube (serum, extract and standard amount of complement), when the tubes are first removed from the incubator, counts as a negative result. Marked lysis in any front row tube after standing for the further period of an hour is recorded as negative if the serum has been tested for diagnostic purposes, but an early opportunity is taken of testing the same serum again; in the case where the serum is that of a syphilitic patient, and the result may be the effect of the treatment, the exact character of the reaction is recorded for future reference when testing the same serum again, and the result is meantime returned as negative.

No lysis occurring in any front row tube at the end of the hour's standing at room temperature indicates a positive reaction, and the corresponding tube in the second row, which contains double the amount of complement, is then examined to see if the serum has been strong enough in deviating power to absorb the double amount also.

The technique which I have adopted adheres therefore to the principles of the original Wassermann-Neisser-Bruck reaction, in that the constituents of the test, being derived from different sources, are as far as possible under control, and the sera can be tested under identical conditions. The only modifications which I have introduced relate (1) to a method of inactivating the human serum, which, I think, increases the delicacy of the test; (2) the substitution of dilutions and volumes for proportions of a cubic centimetre, which makes for convenience and rapidity; and (3) the use of two different amounts of complement, by which more information is obtained regarding the tested serum. No claim is made for originality in regard to the last-mentioned, and as to the second I have since noticed that Weidanz<sup>60</sup> has advocated a similar technique (volumes and dilutions).

Regarding modifications which have been designed to simplify the test, either by using the natural amboceptor or the complement, or both, present in human serum (Hecht,<sup>61</sup> Fleming,<sup>62</sup> Tschernogubow,<sup>63</sup> Bauer,<sup>64</sup> and Stern<sup>65</sup>), I have no practical experience of any with the exception of Stern's, by which I have lately tested a number of sera while subjecting them to the original Wassermann test.

In Stern's method, the serum is used in the same quantity as for the original technique and is left unheated, so that use may be made of its natural complement instead of guinea-pig's serum. The tubes are set up in three rows and each set of three tubes is devoted to the testing of one person's serum; 0.2 cc. serum is added to each tube of the set; into the front row tubes is put  $\frac{2}{3}$  the amount of extract which has been found suitable for the test as carried out according to the original Wassermann technique, *e.g.*, if 0.2 cc. has been found to be a suitable quantity to place in each tube when conducting the test on the original lines, 0.08 cc. of the same extract is placed in each tube of the front row when testing the sera by Stern's method. Into each tube of the second row is put half this amount of extract, and the last row receives the same amount of salt solution. The last row is a control to show that the serum actually contains sufficient complement to effect hæmolysis.

<sup>60</sup> Weidanz, *Berlin. klin. Woch.*, 1908, S. 2240.

<sup>61</sup> Hecht, *Wien. klin. Woch.*, 1908, p. 1742.

<sup>62</sup> Fleming, *Lancet*, May, 1909, p. 1513.

<sup>63</sup> Tschernogubow, *Berlin. klin. Woch.*, 1908, xlv., S. 2107.

<sup>64</sup> Bauer, *Deutsch. med. Woch.*, April 16th, 1908.

<sup>65</sup> Stern, *Zeits. für Immunität.*, 1909, Bd. I, p. 422.

The tubes are incubated for one hour, and into each is then placed 1 cc. suspension of sensitised cells. These are made up in a 2.5 per cent. suspension, instead of 5 per cent. as in the original technique, and are sensitised by the addition of nine to twelve doses of anti-sheep-cell amboceptor. This, and other modifications which make use of anti-bodies to sheep-cells occurring naturally in human serum, which I have had the opportunity of seeing, is certainly more delicate than the original, but suffers from certain objections, some of which may be theoretical, while others are undoubtedly practical. One is, that in testing a number of different sera for the presence of one factor (syphilitic "antibody"), the other factors which influence the test are not constant to all the sera. For example, in the Hecht technique, which relies on the presence of natural anti-sheep amboceptor and complement; in testing a dozen sera one may be dealing with twelve different amounts of amboceptor and of complement respectively. If either be deficient in a serum, the minimum hæmolytic dose of the other is raised. The Stern method overcomes this to a certain extent by using a large amount of amboceptor, so that the smallest traces of complement not deviated are demonstrated, and the next objection, which is a practical one, does not apply so much to it as to the Hecht technique. Extract in the presence of *normal* serum causes a certain amount of deviation of complement, and this is specially the case in unheated serum as already mentioned. If a given normal serum should happen to be short of amboceptor or of complement in the case of the Hecht, or simply short of complement in the case of the Stern method, *but not entirely deficient*, the presence of the extract may be just sufficient to turn the scale against hæmolysis in the tube or tubes containing it, while that containing no extract would show hæmolysis. Such a result would of course be read as a positive reaction. I have seen this happen in using the Stern modification to test a serum which at twenty-four hours old gave a completely negative reaction, and at forty-eight hours (when presumably it had lost some of its complement power with age) a completely positive reaction with the smaller amount of extract.

On this account I would urge that though a\*modification such as Hecht's or Stern's may be adopted with considerable advantage on account of its superior delicacy (together with the original technique) in testing the progress of a known case of syphilis under treatment, when the reaction is required for diagnostic purposes, the matter is so important and the issue so vital that the

original technique, or a modification which adheres to the principle of keeping the reagents for the test constant, should be used.

The following results were obtained in 600 sera tested at the Military Hospital, Rochester Row, on the principles of the original Wassermann method. A little more than half the sera were inactivated by heating for half an hour, and the remainder, by heating for ten minutes only.

TABLE I.

Stage	Number	Positive	Negative	Percentage positive
Primary .. .. .	64	46	18	71·8
Secondary .. .. .	151	186	15 *	90·0
Tertiary .. .. .	37	31	6	83·5
Early latent .. .. .	235	132	103	56·5
Late latent .. .. .	2	0	2	—
Tabes .. .. .	2	1	1	—
Other diseases (syphilis denied or excluded)	44	1 †	43	—
Normal .. .. .	65	0	65	—

\* Thirteen of these had received at least one course of injections or inunctions.

† The positive result was a case of psoriasis with no history of syphilis. Negative results included gonorrhoea, 8; venereal sore (no spirochaetes found and no subsequent symptoms of syphilis), 18; inguinal bubo, 6; sore throat, 1; mediastinal tumour (*post-mortem*: sarcoma), 1; rheumatism, 3; disseminated sclerosis, 2; hemiplegia (no history of syphilis), 1; suspected tabes (no history of syphilis), 2; heart disease, 1.

The following table shows the percentages of positive results obtained by some other workers by the original method. The last two columns give the percentages of positive results obtained by Noguchi on a large number of sera tested on the one hand by the W. N. B. technique, and on the other by his own modification. Noguchi makes use of human cells and anti-human serum in the hæmolytic system in his modification.

TABLE II.

	{ Bruck-Stern <sup>66</sup> Merz Grosser	Ledermann <sup>67</sup>	Jesionek <sup>68</sup> and Meirowsky	Noguchi <sup>69</sup>	
				Original	Modification
Primary .. .. .	72·0	63·0	66·6½	73·9	86·9
Secondary .. .. .	94·1	98·0	96·7	87·3	96·2
Tertiary .. .. .	73·9	96·2	87·5	80·0	87·6
Early latent .. .. .	31·3	75·6	50·3	48·0	66·6
Late latent .. .. .	29·8	65·7	46·4	75·0	84·3
Tabes .. .. .	—	88·0	52·6	44·0	72·2

<sup>66</sup> Bruck, *loc. cit.*

<sup>67</sup> Ledermann, *Deutsch. med. Woch.*, 1908, S. 1760; *Med. klin.*, 1909, S. 419.

<sup>68</sup> Jesionek u. Meirowsky, *Münch. med. Woch.*, 1909, p. 2297.

<sup>69</sup> Noguchi, *Journ. Amer. Med. Assoc.*, vol. liii, p. 935.

A comparison between the results is somewhat difficult without some knowledge of the amount of treatment which the cases examined by the various workers had received. For the most part my cases, being soldiers, were under the systematic treatment now prevailing in the Army, by which a patient once diagnosed syphilis continues under observation till he passes to the Reserve, or is pronounced cured. The effect of treatment on the reaction will be mentioned later, and it will then be seen that it would be impossible to compare results from examinations of soldiers' sera with those of workers who have to deal with civilians whose treatment may be somewhat irregular.

A great difference is noticeable between the percentages of positive reactions in the primary stage, judging by the results shown by different workers; this is doubtless due to the different ages of the primary sores at which the blood was tested, and the question when a positive reaction may be expected to make its first appearance is of some interest. Levaditi<sup>70</sup> found that from eight to fifteen days, and from fifteen to thirty days after the appearance of the sore, 33 per cent. and 57 per cent. respectively were positive. Fischer,<sup>71</sup> reckoning from the date of infection, found four weeks after infection 0 per cent.; five to six weeks, 27.3 per cent.; seven to eight weeks, 75 per cent.; and nine to ten weeks, 80.8 per cent. were positive. Blumenthal and Roscher<sup>72</sup> give similar results, so that it may be said that six to seven weeks after infection, or about fifteen days after the appearance of the sore, one may expect a positive reaction in the majority of cases. A few cases of a reaction occurring before the appearance of the sore have been recorded. The earliest date at which I have obtained a positive reaction has been the twenty-eighth day after the date of infection, and five days after the appearance of the sore. The considerably higher percentage of positive results in syphilis displaying active signs is noted by most observers, and is shown in the above tables.

The effect of treatment in converting a positive into a negative reaction is a matter of the greatest interest to those who believe that a positive reaction to the Wassermann test is not an index of the high state of immunity to which the patient has attained, but due to the perverted state of his tissues resulting from the activity of the invading parasite. As already shown, there is very strong

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<sup>70</sup> Levaditi, Laroche et Yamanouchi, *C. r. de la Soc. de Biol.*, 1908, p. 720.

<sup>71</sup> Fischer, cited by Bruck, *loc. cit.*

<sup>72</sup> Blumenthal u. Roscher, *Med. Klin.* 1909, Nr. 7.

evidence that the test detects not immune bodies but disease products of another kind, and in latent stages it is the only one which gives evidence that the parasite has not yet been extinguished. If one believes with the majority of observers that the efficacy of a treatment designed to suppress and eventually exterminate the spirochæte is reflected in the results obtained by the Wassermann test after that treatment, one will realize how important it is that treatment should be controlled by examination of the blood in this manner. Recognising the valuable information available from the careful records which are kept of the treatment of every case of syphilis in the Army, I have made a summary of the case sheet of each patient whose serum I have tested, in the hope of obtaining thereby some idea of the efficacy of our system of treatment. The number of tests is necessarily few at present, but it is hoped that in time valuable information may be gained in this way.

The following table shows the results obtained so far with patients who have been treated with regular courses of injections, or by inunctions or both. One course of injections is reckoned as 6 grains of mercury in cream for the first, and 4 grains for each subsequent course, or the equivalent of these in calomel or atoxylate of mercury. One course of inunctions is considered to consist of thirty to forty or more rubbings with 5i mercurial ointment.

Positive reactions are shown under two headings, 0·1 and 0·2 respectively, besides the totals; 0·1 indicates that only the standard amount of complement was absorbed, 0·2 that twice this amount was deviated. The latter is considered to be the stronger reaction.

TABLE III.

	POSITIVE			NEGATIVE	Percent +
	0·2	0·1	Total +		
Untreated, including primary cases from the fifteenth day	66	19	85	6	98·5
After 1 course .. .. .	17	29	46	9	88·6
„ 2 courses .. .. .	24	14	38	11	77·5
„ 3 „ .. .. .	8	19	27	15	64·5
„ 4 „ .. .. .	3	14	17	13	56·5
„ 5 „ .. .. .	4	13	17	17	50·0
„ 6 „ .. .. .	3	6	9	17	34·6
„ 7 „ .. .. .	5	11	16	13	55·0
„ 8 „ or more..	0	3	3	11	21·5

It will be seen that a diminution is apparent: (1) in the proportions giving the stronger reaction, and (2) in the total positive as treatment progresses. These facts are in agreement with those

shown by Bruck,<sup>73</sup> Citron,<sup>74</sup> Ledermann,<sup>75</sup> and others,<sup>76</sup> all of whom also emphasise the effect of early treatment in this respect. Comparison between the effects of different lines of treatment is somewhat difficult, but I have made up the following table which shows the numbers of positive and negative reactions obtained at different periods under various treatments. Division into courses was not possible in a number of cases, as the number of courses of the arylarsonates administered in addition to the mercurial injections varied, and it was also impossible to find the equivalent for a course of mercury administered by mouth.

TABLE IV.

	UNDER SIX MONTHS INCLUDING PRIMARY		6-12 MONTHS		12-18 MONTHS		18-24 MONTHS		24 MONTHS AND OVER	
	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Mercury atoxylate .. ..	100	18	5	4	—	—	—	—	—	—
Mercurial cream injections and arylarsonates at intervals	4	2	6	1	13	9	6	4	11	10
Partly by mouth and partly by injections	—	—	—	—	1	0	2	0	21	9
Hg injections and injections	5	1	3	2	8	0	12	4	9	7
Hg injections only .. ..	43	10	3	6	16	7	6	7	20	21
Arylarsonates .. ..	—	—	5	0	3	2	3	0	3	0

It would appear from these tables that treatment might be prolonged with considerable advantage beyond two years, especially when it is remembered that though a negative reaction may be maintained, and eventually become permanent under prolonged treatment, there is a great tendency for it to return to positive when treatment is abandoned too early.

*Note.*—On p. 597, vol. xiv., 5th line from bottom, for “liquids” read “lipoids.”

<sup>73</sup> Bruck, *loc. cit.*

<sup>74</sup> Citron, *Med. Klin.* 1902, Nr. 3.

<sup>75</sup> Ledermann, *loc. cit.*

<sup>76</sup> Sabrazes and Eckenstein, *loc. cit.*

# MEDITERRANEAN FEVER IN GIBRALTAR IN 1909.

By MAJOR C. E. P. FOWLER.

*Royal Army Medical Corps.*

AN outbreak of Mediterranean fever occurred amongst the troops in September, 1909. During this month and the first half of October twelve patients were admitted to the Military Hospital suffering from this disease. One case also occurred amongst the married families in October, and one more case amongst the men in November. The outbreak was a very interesting one, developing as it did, without any apparent change having taken place in the local conditions of food supply of the soldier.

## RETURN OF MILITARY CASES OF MEDITERRANEAN FEVER IN GIBRALTAR DURING THE YEARS 1899 TO 1909.

Year	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1899	..	..	..	..	1	5	..	1	7	3	3	..	20
1900	1	..	1	..	1	1	3	..	..	2	..	1	10
1901	5	1	..	2	..	1	1	1	..	1	..	..	12
1902	..	..	..	..	..	2	1	..	..	..	2	..	5
1903	1	2	1	..	4	1	..	..	..	..	..	..	9
1904	..	..	..	..	..	..	..	..	..	..	..	..	..
1905	..	..	..	2	..	1	..	..	..	..	..	..	3
1906	..	..	..	..	..	..	..	..	1	..	..	..	..
1907	..	..	..	..	..	..	1	..	1	..	..	..	2
1908	..	..	..	..	..	..	..	..	..	..	..	..	..
1909	..	..	..	..	..	..	..	..	11	2	1	..	14

## RETURN OF CASES OF MEDITERRANEAN FEVER (CIVILIAN) AT GIBRALTAR DURING THE YEARS 1899 TO 1909.

Year	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1899	..	..	..	..	..	..	..	..	..	..	..	..	..
1900	1	1	..	..	..	..	..	..	..	..	..	..	2
1901	..	..	..	..	..	..	..	..	..	..	..	..	..
1902	..	..	..	..	..	..	..	..	..	..	1	..	1
1903	..	..	..	..	..	..	..	..	..	..	..	..	..
1904	..	..	..	..	1	..	..	..	..	..	..	..	1
1905	..	..	..	..	1	1	3	3	2	1	..	..	11
1906	..	..	..	..	1	..	..	..	..	..	1	1	3
1907	1	..	..	1	..	..	..	..	..	1	..	..	3
1908	..	..	..	..	..	..	..	..	..	..	..	..	..
1909	..	..	..	..	2	..	..	..	..	2	..	..	4

Mediterranean fever has never been very prevalent in Gibraltar. The preceding table shows its incidence during the last ten years, both amongst the military and civil population. It will be seen that no case has been returned in the military records since September, 1907. The civil returns show no cases during 1908, but four this year. Of the latter cases, two only, which occurred in May, were confirmed by a Widal's test, the others proving negative to *Micrococcus melitensis*, but one of them yielded a reaction to *Bacillus typhosus*, and it is probable that the diagnosis in each patient was at fault.

During 1909 it may, therefore, be stated that, with the exception of the two cases above quoted, Mediterranean fever was non-existent in Gibraltar up to the month of September. Officially this was so, but the statement may not be in total agreement with the opinion of every medical man in the place, as it is known that some of them have the idea that certain cases returned as pyrexia of uncertain origin and influenza, or unreturned altogether, during the early part of the year, were in reality mild cases of Mediterranean fever. Our opinion is based solely on the examination of material sent to this laboratory. Although many blood serums had been submitted for Widal's test up to September, in only the two civil cases above mentioned was any reaction given with *M. melitensis*. Again it may be remarked that the clinical characters of such a disease as Mediterranean fever are very suggestive, and it is almost certain that material from cases bearing any resemblance to such a troublesome complaint would be submitted for a laboratory examination. However, the opinion of the clinician is perhaps worth as much, or more, than that of the bacteriologist, and, therefore, the views held by one of the former, and quoted in a report to be published by him, are here given *in extenso*.

"During the spring and early summer of this year several cases of fever were admitted to hospital, the nature of which was not quite clear, presenting some of the symptoms of influenza, a good many had to be returned as such, but the diagnosis certainly in some cases was not wholly satisfactory, and the clinical conditions not typical of influenza, as understood by the medical profession. Taken in conjunction with the fact that many similar cases have been notified as influenza from the civil population, some of which in the opinion of civilian medical gentlemen were in reality mild attacks of Mediterranean fever, it is possible, if not probable, that the diagnosis of influenza in some of our hospital cases was incorrect, and that these attacks were in reality those of mild

Mediterranean fever. In July the discovery of *Phlebotomus papatasi* on the Rock caused rather more attention to be directed to phlebotomus fever than was perhaps justified by the clinical pictures of the pyrexia of uncertain origin which were under treatment. Undoubtedly, there were many cases of true phlebotomus three-day fever, but some cases were returned under this heading, *i.e.*, were diagnosed pyrexia of uncertain origin officially, which lasted from five to eight days, and were certainly not the true phlebotomus fever and were probably Mediterranean, a supposition which is supported by the fact that one such case was subsequently re-admitted for this disease, and in two other cases of Mediterranean, previous attacks of an exactly similar nature were traced."

From the above remarks it can be seen that the writer considers that cases of Mediterranean fever may have been occurring during the summer, of such a mild nature, that a suspicion of the gravity of the disease was not awakened until after events showed what might have been present. There may be some truth in such a theory, but it must be remembered that one is always on the watch in Gibraltar for the occurrence of Mediterranean fever. It is not as though the disease had so died out that one was lulled to security as to the unlikelihood of its re-appearance.

As regards the opinion of civilian practitioners quoted above, that cases of Mediterranean fever have been occurring amongst their patients, but have not been returned as such, or placed under some other name like influenza, a careful enquiry has been made. Some deny altogether that any such suspicious cases have occurred in their practice, others state that there may possibly have been one doubtful case. One practitioner admits that amongst his patients there may, perhaps, have been five or six who suffered from an anomalous type of fever, which may have been Mediterranean fever, some of the clinical symptoms simulating this disease. Such a diagnosis was not returned, nor were any samples submitted for examination, owing to difficulties in dealing with the patients. As Medical Officer of Health, one is constantly in touch with all the civilian practitioners, who are given to fully understand how desirable it is that any suspicious cases of fever should have samples of blood, &c., submitted for examination and confirmation of diagnosis. However, in private practice, more especially amongst an uneducated people, the difficulties of obtaining material for examination must be known to be appreciated. Again, there is this point to be thought of by the practitioner in a place like

Gibraltar, where the profession is in keen competition for patients. Say that the diagnosis of an infectious and notifiable disease is made in a case of some doubt, the patient and house are marked, and liable to visitation by the servants of the sanitary authorities, of whom people of this class are always in some dread. Can one altogether wonder that a practitioner's conscience becomes dulled, that matters are sometimes allowed to drift, and a definite diagnosis left unmade. Many cases of influenza were notified during the spring and summer, so much so, that this disease was struck off the list of notifiable diseases. No cases have since been returned under Mediterranean fever, in place of those previously diagnosed as influenza. Taking a broad view of the whole matter, there appears little or no evidence to make the statement that Mediterranean fever was in reality existent before September. Since then, the incidence has been entirely amongst the military population.

The character of the disease was of an exceptionally severe type, but fortunately no patient has succumbed. Some of the cases are of peculiar interest, owing to the mixed infection with both *B. typhosus* and *M. melitensis*. This took place in three of the patients; in one the initial attack was that of pyrexia of uncertain origin lasting, with convalescence, twenty-seven days. After being out of hospital nine days he was re-admitted, and *B. typhosus* was isolated from the blood. After forty days, and when convalescent, an attack of Mediterranean fever developed and his blood serum yielded a reaction to *M. melitensis* in 1 in 160 dilution. In the second, the patient was an invalid awaiting transfer to England. He developed fever and *B. typhosus* was isolated from the blood, and shortly after his blood serum yielded a positive reaction to *M. melitensis*. In the third, both organisms were isolated in one series of cultures from the blood.

The milk supply of Gibraltar must be referred to, in order to make it plain that no change whatsoever had taken place in the methods or customs of supply. This is mentioned, as a letter to the public Press lately quoted Gibraltar as an instance of a spot where a recrudescence of Mediterranean fever had taken place owing to the "ban having been removed" from the consumption of goat's milk."

As a matter of fact there never has been a ban placed on the consumption of goat's milk. The conditions have been as follows: The number of goats and kids kept on the Rock have numbered during the last six years from three to four hundred. These are

the property of various owners and are kept in sheds scattered indiscriminately in any suitable or unsuitable position. A certain number of passes are granted for the animals to graze on allotted areas of Crown or military lands. A careful watch has been kept on these goats, and their blood reaction noted periodically (as a rule twice a year). The number of positive reactions obtained has varied from 10 to 15 per cent., showing that this percentage of the animals possibly had, or were suffering from, infection with the *M. melitensis*. On no occasion has the organism itself been isolated from the blood, and only twice from the milk. Milk yielded by Gibraltar goats has been, and is still, sold without any restriction whatever being placed upon it as a commercial article. Goats have been, and are still, driven about the streets in herds, and milked by the goat-herds at the doors of customers requiring a supply. It is presumed that my predecessor in the office of Medical Officer of Health, and Specialist Sanitary Officer, saw no justification to make any rules to restrict or regulate the traffic of locally produced milk. Since my tenure of office, this question has on several occasions been brought forward, but it has never seemed justifiable to interfere with the wishes and customs of the local inhabitants.

As regards milk introduced into Gibraltar from Spain a By-law made in April, 1907, read as follows: "No person shall sell or offer for sale milk introduced into Gibraltar unless the same has been boiled in Gibraltar previous to such sale or offer for sale. Provided that nothing herein contained shall prevent the delivery or sale of unboiled milk to a purveyor of milk in a duly-certified milk shop." Goat's milk imported from Spain represents about two-thirds of the total goat's milk consumed in Gibraltar. About an equal quantity of cow's milk is imported to that locally produced.

It may be taken as fairly certain that very little, if any, imported milk reaches the consumer without having previously undergone the process of boiling. The Sanitary Inspectors are continually taking samples, but very few cases occur in which prosecution is necessary for the non-observance of the above bye-law.

There are also about fifty cows on the Rock, and the milk of these animals is supplied chiefly to the better class of inhabitants, who dislike the idea of drinking goat's milk. In many cases the cows and goats are herded together in sheds.

As regards the milk supplied to the troops, the following is a record of reports called for by the Principal Medical Officer, from the various Medical Officers in charge of Districts.

*No. 1 District.*—North Front and Catalan Bay (Norfolk Regiment two companies, Bedford Regiment two companies). “Tinned milk is used by the troops. Officers’ Mess supplied with fresh milk by the Swiss Dairy Company.”

*Nos. 2 and 4 Districts.*—Casemates and Moorish Castle (Royal Garrison Artillery). “Condensed milk only is used by troops, but men sometimes obtain milk in the market, or in shops in town. Fresh milk is brought by some of the married families. One hawker only has permission to sell milk in married quarters.”

*No. 3 District.*—No troops.

*Nos. 5 and 6 Districts.*—Town Range, Hargraves and St. Jago’s (Army Service Corps, Royal Engineers, and details.) “Condensed milk only is used.”

*No. 7 District.*—Jumper’s Bastion, Rosia, South Barracks (Norfolk Regiment six companies, Royal Engineers and Army Ordnance Corps). Royal Engineers and Army Ordnance Corps, condensed milk only. Norfolk Regiment, milk supplied by Debono, boiled in companies’ kitchen.”

*No. 8 District.*—Buena Vista and Windmill Hill (Bedford Regiment, six companies).

“Buena Vista. (Bedford Regiment, four companies), use goat’s milk supplied by Debono, also married families. Regimental Institutes, tinned milk only.”

“Windmill Hill (Bedford Regiment, two companies), use condensed milk only.”

*No. 9 District.*—Europa, Europa Pass (Royal Garrison Artillery, and Royal Engineers). “Europa, Royal Garrison Artillery, use tinned milk, as do also Royal Engineers at Europa Pass.”

From the above reports it will be seen that fresh goat’s milk has been used by the headquarter companies of both the Norfolk and Bedford Regiments. This milk was supplied by Debono. It is supposed to have been boiled in the companies’ kitchen as soon as received.

The supply of fresh milk to all troops was stopped on October 28th.

*The Hospital Supply.*—This was contracted for by Patrick Vella, who, in turn, arranged with Debono to make the issue. At an interview with Debono at his sheds, the following information was elicited: Each day he supplied to the hospital about 20 to 25 pints of cow’s milk and about 100 to 150 pints of goat’s milk. He was able to supply the goat’s milk *entirely* from his own goats and never had to draw on any outside source. As he only had two cows

he used to obtain the extra amount of cow's milk needed from Azopardi, Europa Road.

The cow's milk supplied to the hospital was supposed to be for drinking purposes, the goat's milk for making puddings, &c. There was a standing order in force that all milk was to be sterilised at once on delivery, and the cook affirms that this order was regularly carried out in the large steriliser provided.

The use of goat's milk in the hospital was discontinued on September 21st, and the use of cow's milk on October 15th. From these dates tinned milk was substituted.

It is to be noted that Debono supplied the hospital and the head-quarter companies of the Norfolk and Bedfordshire Regiments.

Of the fourteen cases of Mediterranean fever, thirteen at some time or other drank this milk.

Further, it is to be remarked that fifteen goats and two kids from Malta were landed at Gibraltar in April of this year, bearing a clean bill of health from the veterinary surgeon to the Public Health Department of Malta. These goats were placed in quarantine at the North Front for fourteen days, and the blood of each goat was examined on three occasions for any reaction with *M. melitensis*. Two goats yielded a positive reaction, and orders were issued that these goats must be disposed of outside Gibraltar. The remainder were passed as fit, sent to the consignee Debono, and duly placed in his shed amongst his other fourteen goats. At a subsequent examination of these imported goats on October 4th, there were four which were found to give a positive reaction to *M. melitensis*, and one of these tallied very closely, if not completely, to the description taken of one of the goats excluded as unfit in April. Goats are difficult animals to mark down from a paper description, and absolute proof that this was the identical goat was not possible.

It has previously been stated that no change whatever had been made in the routine milk supply, food, or surroundings of the troops, and yet a recrudescence of Mediterranean fever took place after more than two years' quiescence. And yet during this period it was well known that 10 to 15 per cent. of the local goats yielded a positive reaction to *M. melitensis*. The question naturally arises, Had these seventeen goats imported from Malta any causative agency in the reproduction of the disease, or were their arrival and the recrudescence merely coincidences?

It is somewhat striking that thirteen out of the fourteen patients should have been, within a reasonable time of their illness, con-

suming milk from the dairy to which these goats belonged. The fact or coincidence is mentioned for what it may be worth. Proof would be impossible of attainment. It is well known that goats will vary in their reaction to *M. melitensis*, and a quarantine of fourteen days is really worth but little as a preventive measure against the introduction of infected animals, even though the most careful examination may be carried out during this period. The whole of the seventeen animals were females, and it is possible, and even probable, that if they were to be again tested after dropping a kid, they would be found to yield a reaction, and perhaps be passing the micrococcus in their milk. The further importation of goats from Malta is not likely to take place again during my tenure of office as Medical Officer of Health.

A brief analysis may now be made of the cases. A glance at the table will give some general idea of the course of the disease.

Out of the fourteen cases it may be stated that three were certainly, three were probably, and two were possibly, infected whilst in hospital.

Three were supplied with milk in their ration from the same source as the hospital. One (an officer's daughter) drank raw milk from the same supply. One (an officer), mess milk supply from the same source. One without any apparent connection with the above.

It may therefore be stated with a certain degree of truth that three out of the fourteen cases had some connection, either near or remote, with Debono's supply of milk. The coincidence in the occurrence of the majority of the cases around one spot is too striking to be neglected, but to put one's finger definitely on the incriminating agent is impossible.

As previously mentioned all milk, whether delivered to barracks or hospital, was supposed to have undergone soon after delivery the process of boiling or sterilisation. It would appear probable that on occasions this precaution was only partially carried out.

The case of the officer's daughter is most definite. The only supply was from Debono, and it was freely admitted that the milk was drunk in a raw state.

Another striking fact is that no cases occurred amongst the civilian population during this period. Can it be suggested that as Debono's animals were the only ones affected, and all their milk was supplied to soldiers, therefore civilians were exposed to no danger? The herd of goats belonging to Debono have since been dispersed, and many of them sold to Tangier.

Name	Admitted	Barrack Room	Previous admissions to hospital	No. of days between first and second admission	Reaction	Contracted	Remarks
Gr. J. H., 55th Coy., R.G.A.	3.9.09	No. 6 Room, Cavemates Barracks	Alcoholism, 27.7.09 to 11.8.09	24	Sept. 6, <i>M. m.</i> + 1 in 80. <i>B. t.</i> -	Possibly in hospital	-
Gr. F. A. G., 6th Coy., R.G.A.	6.9.09	No. 6 Room, Middle Block, Moorish Castle	Gonorrhoea, 18.6.09 to 19.8.09	19	Sept. 10, <i>M. m.</i> + 1 in 160, <i>B. t.</i> -	Probably in hospital	-
Dr. F. P., "E" Coy., 2nd Bedford Regt.	21.8.09	No. 1 Room, No. 1 Hut, Buena Vista Barracks	Diarrhoea, 9.7.09 to 28.7.09; indigestion, 29.7.09 to 16.8.09	6	Sept. 10, <i>M. m.</i> + 1 in 80, <i>B. t.</i> -	Probably in hospital	-
Pte. A. P., R.A.M.C.	14.9.09	No. 5 Room, R.A.M.C. Barracks	Attending a case of Mediterranean fever for 5 days prior to his own admission	..	Oct. 13, <i>M. m.</i> + 1 in 160, <i>B. t.</i> -	In hospital	-
Pte. J. A., "F" Coy., 2nd Norfolk Regt.	15.9.09	No. 15 Room, 2 Bay, South Barracks	Veneral sore, 5.7.09 to 2.9.09	14	Sept. 15, <i>M. m.</i> + 1 in 160, <i>B. t.</i> -	Probably in hospital	-
Gr. W. Q., 4th Coy., R.G.A.	1.8.09 (enteric fever)	No. 3 Room, New Soldiers' Block, Europa	Pyrexia of uncertain origin, 28.6.09 to 24.7.09	9	Aug. 7, <i>B. t.</i> ex blood. Sept. 15, <i>M. m.</i> + 1 in 80.	In hospital	-
Boy A. C., 9th Coy., R.G.A.	19.9.09	No. 3 Room, East Block, Moorish Castle	Abrasion, 28.7.09 to 3.8.09	53	Sept. 21, <i>M. m.</i> + 1 in 160, <i>B. t.</i> -	Uncertain	-
Pte. G. B., "C" Coy., 2nd Norfolk Regt.	20.9.09	No. 6 Room, South Barracks	Sore throat, 5.11.09 to 8.12.09	287	Sept. 21, <i>M. m.</i> + 1 in 160, <i>B. t.</i> -	..	Ration milk supplied from hospital contractor.
Pte. G. M., "F" Coy., 2nd Norfolk Regt.	30.9.09	No. 15 Room, 4 Bay, South Barracks	Indigestion, 29.7.09 to 17.8.09	44	Sept. 21, <i>M. m.</i> + 1 in 160, <i>B. t.</i> -	..	Ration milk supplied from hospital contractor.
Gr. T. E., 8th Coy., R.G.A.	10.4.09	No. 6 Room, 2 Block, Europa	<i>Nil</i> .. .. .	<i>Nil</i>	Oct. 4, <i>M. m.</i> + 1 in 160, <i>B. t.</i> -	In hospital	-
Lieut. A. J. P., 2nd Bedford Regt.	27.9.09	No. 5 Officers' Quarters, Buena Vista Barracks	Pyrexia of uncertain origin, in quarters, 26.8.09 to 2.9.09	24	Oct. 19, <i>M. m.</i> + 1 in 20, <i>B. t.</i> -	..	Mess milk supply from hospital contractor.
Pte. R. C., "E" Coy., 2nd Bedford Regt.	15.10.09	No. 1 Room, 3 Hut, Buena Vista, 22.8.09 to 2.10.09; No. 2 Room, 4 Hut, North Front, 2.10.09 to 15.10.09	Debility, 13.8.09 to 21.8.09	55	Oct. 19, <i>M. m.</i> + 1 in 160, <i>B. t.</i> -	..	Ration milk supplied from hospital contractor.
Gr. J. T., 4th Coy., R.G.A.	1.12.09	No. 1 Room, New Block, Europa	Bronchitis, 27.8.09 to 2.10.09	59	Dec. 17, <i>M. m.</i> + 1 in 320, <i>B. t.</i> -	Possibly in hospital	-
Miss O. ..	29.10.09	Officers' Quarters No. 42	.. .. .	..	Nov. 1, <i>M. m.</i> + 1 in 160, <i>B. t.</i> -	..	Drank raw milk supplied by hospital contractor.

## SOME HINTS ON STAFF TOURS.

BY MAJOR W. T. MOULD.  
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I HAVE written these notes in the hope that they may be of use to officers who go on a Staff Tour for the first time, and also in the hope that they may elicit opinions on several points about which staff officers with whom I have been on tours have held opposite views.

The first thing is: What books should one look up? I think this list is complete:—

(1) "Training and Manœuvre Regulations," Sections 6 to 20, which tell us what a Staff Tour is and how it is carried out.

(2) "Field Service Regulations," Part I., Chapter II., must be studied, as all orders and reports are to be written in accordance with the instruction given here. In this book also will be found a range table for rifle and gun fire, which must be remembered when selecting sites for collecting and dressing stations, and considering the movements of our wagons.

(3) "Field Service Regulations," Part II., should be read, especially Chapters II., III., and VI., while Chapter X. on the Medical Service must be thoroughly mastered.

(4) "The Field Service Pocket Book" should be read, and all matters which bear on medical points and the duties common to all arms should be marked in red ink for easy reference, as this book is always carried with one.

(5) "War Establishments," so that one can study the composition of any force and work out its strength, and see the normal proportions of the various arms and the allotment of the medical units.

(6) "The Field Service Manual" for the Army Medical Service, as it contains the full details of the *personnel*, transport and equipment of our units. One should know all details of our units—not merely officers, men, and wagons, but also the road and camp spaces required, and the rail requirements.

(7) "The Training Manual" tells us something, too, as regards the field units.

When ordered on a Staff Tour one gets the General and Special Ideas, with the maps of the country in the sphere of operations, and one should first read the General Idea, which gives the situation as both sides know it. Then the Special Idea, which gives the problem to be solved, should be read; and this needs careful study, and one should form some sort of opinion as to what operations are

likely to be carried out. Next, the maps should be taken, and the features of the country studied and the chief points fixed in one's mind, particularly main roads, railways, rivers, and hill ranges. Then with the Ideas one should fix the position of one's own force with its medical units, and also that of the enemy.

With these Ideas, the task set before the tour takes place will be sent, and it will be something in the nature of an "appreciation." I do not think we should make one as mentioned in "Training Regulations," but in its place a memorandum on all things "medical" in connection with the scheme should be drawn up, and this should, I think, be addressed to the Adjutant-General. Even if this task is not set it should be done for one's own information, and it should be written as Director of Medical Services. If an officer is, as usual in these tours, only an Administrative Medical Officer, he must know what other units there are to evacuate the sick and wounded, and to treat them behind his field ambulances; for in all schemes which I have seen no mention is made of our units other than the ambulances, yet, to get full benefit from a tour, one must consider the whole medical problem. I have found the best way to do this is to write under the following headings:—

(1) To detail the position of affairs and the situation of the troops, as laid down in the Special Idea.

(2) To give in detail the force with its strength, as laid down in "War Establishments," and at the same time to work out the Royal Army Medical Corps *personnel* with the various units apart from the actual medical units.

(3) Then the line of communication and base medical units, which would have been mobilised for the force should be detailed, working this out from the books I have mentioned above. Thus, clearing, stationary, and general hospitals should be mentioned, also ambulance trains, medical store depôts and the sanitary units as one would expect to find them, and an opinion should be given, as Director of Medical Services, as to where hospitals should be opened at once for the reception of sick from the very first, and, having regard to the scheme, where one would think they are likely to be required after the commencement of hostilities. When working out these base and line-of-communication units it must be remembered that territorial troops have only general hospitals behind the field ambulances, but the gap is to be filled in by voluntary-aid detachments when organised.

(4) Then one should consider the possible lines for evacuating patients, and the means of carrying it out—by road, rail, or water. If by road, by ambulance wagons, empty supply wagons, by

local transport or special sick convoys. By ambulance, ordinary or empty supply trains on a railway line; and if by water, by what means?

(5) The amount of sickness must be discussed, taking into consideration the season of the year, the fitness of the troops, and if any epidemic disease is prevalent in the sphere of operations. And, remember, under the most favourable conditions, 3 per 1,000 of the troops will require admission to hospital daily, besides trivial cases.

(6) Casualties must be discussed after having considered the strength of the opposing forces, and the nature of the fighting that is likely to take place. In an engagement 5 to 20 per cent. of casualties may be expected, of whom 20 to 25 will be killed; of the wounded 20 per cent. can walk, 60 per cent. require sitting-up accommodation, 15 per cent. require lying-down transport, while the remaining 5 per cent. cannot be moved.

(7) Then one should make recommendations on sanitary matters, and on such matters as rations, tents, billets, blankets, &c., which seem necessary.

(8) Then the points on which information is needed by the medical authorities to facilitate their work should be mentioned, such as existing hospitals, the amount of local transport, and so on.

No doubt other points can be suggested by officers, but I hope that these hints will be found useful; and unless these points are in one's mind when starting on a tour, one will not benefit much from it.

When the officers taking part in a tour assemble a narrative of events up to date is furnished, and one is asked to write a short appreciation on the situation as it then presents itself. As a Director of Medical Services this will be some general instructions as regards ambulances, clearing any sick with the force, and probably some arrangement for getting a clearing hospital to railhead. As Director of Medical Services, one would be dealing with the head-quarter staff and Administrative Medical Officers. If, however, one had to do this as Administrative Medical Officer one would be dealing with the divisional staff, and one might have to draft some corps orders on these points.

When the practical work of the tour commences, one finds oneself acting either as an Administrative Medical Officer or as an Officer Commanding Field Ambulance, or as a Sanitary Officer, or detailed, perhaps, to collect information.

As an Administrative Medical Officer one has the field ambulances only with the Royal Army Medical Corps *personnel* attached

to corps under one's orders. There is, I find, a tendency to regard the Clearing Hospital as at the disposal of the Administrative Medical Officer, whereas it is a line-of-communication unit, and the Administrative Medical Officer can only ask for its assistance and state where it can help him most. During an action the Administrative Medical Officer handles the ambulances as divisional troops, and they are not attached to brigades or under the orders of a Brigadier, which I find few combatant and many of our officers have not yet grasped. After an action, the Administrative Medical Officer will have to arrange to dispose of the cases from the ambulances, and in this connection he should not forget to mention that he has to inform the Director of Medical Services how many casualties have occurred and how they are disposed of.

But the most important and difficult work of a tour is the writing of orders, which is a matter that requires thought and practice. As I mentioned before, Field Service Regulations, Part I., Chapter II., needs to be studied on this matter so as to be able to do this in proper form. The orders the Administrative Medical Officer writes are of two kinds: (1) Drafts for insertion in Divisional Operation Orders; and (2) Corps Orders.

The Operation Orders should only contain the information on medical matters that everybody requires to know, and in drafting orders one must always keep this in mind and be careful to insert nothing else. I give here some specimen orders which have been approved:—

“No. A” (Medical).

I. Field Ambulance will receive the casualties from the line Broadlees—Custon inclusive. It will take up position in the vicinity of Burgoyne.

Now this order tells everybody what this Ambulance is expected to do, and the mention of Burgoyne will enable wounded to find their own way, or be sent back to a place where they will receive attention. Observe, too, that there are no orders to the Officer Commanding as regards any details, which (if any) will appear in Corps Orders.

“No. B.” No. IV. Field Ambulance, less one Bearer Division, will march with Centre Column.

“No. C.” One Bearer Division of No. IV. Field Ambulance will march with the Advance Guard.

“No. D.” No. V. Field Ambulance will remain in reserve at Kearsney.

Other examples could be given, but these, I think, explain sufficiently the scope of Operation Orders for our Service.

The Corps Orders contain the full detailed orders that the Administrative Medical Officer issues to ambulances and other Royal Army Medical Corps officers. The usual reference to the map should be given and care taken to date and time them, and also to say to whom they were distributed. It is, I find, a question as to how far they should follow Operation Orders in giving the situation and intentions of the General Officer Commanding. One General Staff Officer told me they should, while another said nothing of this sort should appear in them; but, at any rate, they should repeat Divisional Orders as regards the detail of the troops and the position of all the ambulances. Then the orders as regards opening tent divisions and the establishment of collecting and dressing stations, with the evacuation to the rear of casualties so far as the Administrative Medical Officer can give orders at the time. This is all the work to be done as Administrative Medical Officer, unless one were given the task of going over a certain portion of the country to plan out the medical arrangements in the event of an action being fought there (perhaps without reference to the scheme on which one started), in which case one would have to mention any local resources.

As an Officer Commanding Field Ambulance one would usually work with some officer who was commanding troops. Then, knowing the position he was taking up, the sites for the collecting and dressing stations should be selected, the roads along which the ambulance wagons were to run arranged, and also the distribution of the stretcher squads behind the fighting line. After an action he would report the number and nature of the casualties to the Administrative Medical Officer, so that he could arrange for their disposal. Of course this task might be set to be done without the actual disposal of the troops being told one. The Officer Commanding Field Ambulance may be asked to write his orders, which, of course, are the usual daily orders for a unit.

Another task often set is to work as Sanitary Officer and report on camping grounds, bivouacs, or possibly the billeting of force, and for this the Field Service Pocket-book is the guide. Another task that may be set at a staff tour is to select a site for a hospital and to report on local resources. As regards\* reporting on the capabilities of a town to receive sick and wounded, the following points need attention. If one goes to the local police station a good deal will be found out about them, and then by going over the place one can form one's own conclusions:—

(1) Find out if there is any local hospital, or hospitals, and, if so, how many cases can be taken in, as, of course, it would not be

empty at the time. These cases would be treated entirely by the hospital and need only to be controlled by us.

(2) Ascertain if there are institutions, such as workhouses, which would take a certain number of cases, but would need some staff and equipment.

(3) Examine hotels, boarding schools, or convalescent homes which would have beds, bedding, and ordinary utensils, with many servants, but which would require complete medical and nursing staff and medical equipment.

(4) Examine public halls, elementary schools, and the like which could shelter cases, but have limited sanitary and washing accommodation. If sanitary appliances could be supplied temporarily and a staff were provided, these buildings could keep cases for a time. Also one should note if local resources could be available for the conversion of such buildings into a hospital.

(5) The number of medical men and horses in the place should be noted; also the amount of labour of both sexes to be engaged, as in an emergency unskilled labour must be employed.

(6) The number of chemists' shops and their supplies should be noted; in this country very small stocks are kept, as they are replenished so easily from wholesale houses at short notice, so little reliance can be placed on them.

(7) The upholsterers', ironmongers', and china shops should be noted, as beds, bedding, and utensils could be purchased in an emergency.

(8) The local resources for providing temporary latrine and kitchen and similar accommodation should be noted.

(9) And—what is really an Army Service Corps matter—the amount of food and comforts that could be obtained in the place.

(10) The amount of local transport should also be ascertained; cabs, omnibuses, and motors of all kinds that could take sitting-up cases, and vehicles also that could be used for lying-down cases.

(11) The railway station should be visited to see its facilities for entraining cases, and also to see if a rest station could be established in it.

(12) A plan of the place should be obtained, and all places one mentioned marked on it, or, if unable to get this, one should endeavour to make a sketch.

One last hint. Staff Officers study our organisation in these days, so a general knowledge will not do on tours, and the Royal Army Medical Corp officer must know his subject thoroughly. I hope these notes will be found useful by brother officers, and additional hints and criticisms will be welcomed.

## ADAPTATION OF MOTOR OMNIBUS AND SCOTCH HAY-CART FOR CARRIAGE OF WOUNDED MEN.

BY LIEUTENANT-COLONEL H. E. R. JAMES.  
*Royal Army Medical Corps (retired.).*

IN all schemes of medical aid, whether for manœuvre or for war, the adaptation of vehicles not specially constructed for the purpose of carrying wounded must play a considerable part, and in such adaptations it should be an object to avoid making structural alterations, and to use articles which are ready to hand as far as possible. The motor omnibus properly adapted forms a most excellent means of conveyance on good roads, being speedy and comfortable. But without special adaptation it is quite unsuited to the conveyance with any degree of comfort of more than one lying-down patient upon the floor, the seats being too narrow.

By the courtesy of the management of the London General Omnibus Company I have been enabled to measure up one of their newest standard bodies, which may presumably be taken as a type of such omnibus for the next few years and to test the method of loading it.

The internal dimensions that matter are as follows: Length 11 feet 3 inches, width at level of seat 4 feet 6 inches, width half way between seat and roof 5 feet 6 inches, height (approximate) 5 feet 8 inches, width of door 2 feet, width of seat 1 foot 4 inches.

The accompanying diagram shows the general arrangement.

There is a brass arm halfway along the seat which forms an obstruction; the handrail to the steps leading to the roof is also an inconvenience to the carrying in of stretchers. The seat and back are usually cushioned in two sections on each side. Stretchers are necessary to the adaptation described, both in the motor 'bus and in the hay cart.

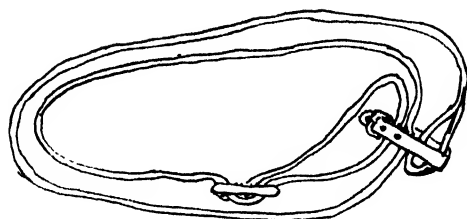
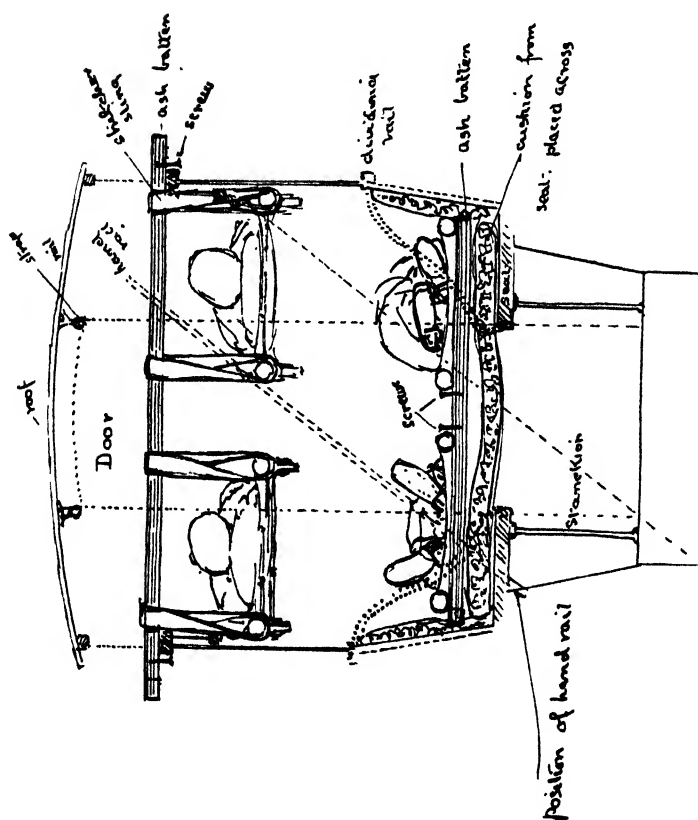
The *structural alterations* required are:—

- (1) The removal of the brass arm which divides the seats.
- (2) *Possibly* the removal of the handrail to admit the stretchers.

The arm can be removed with a screw-driver. A screw-wrench is necessary for the hand rail. The *extraneous apparatus* necessary is:—

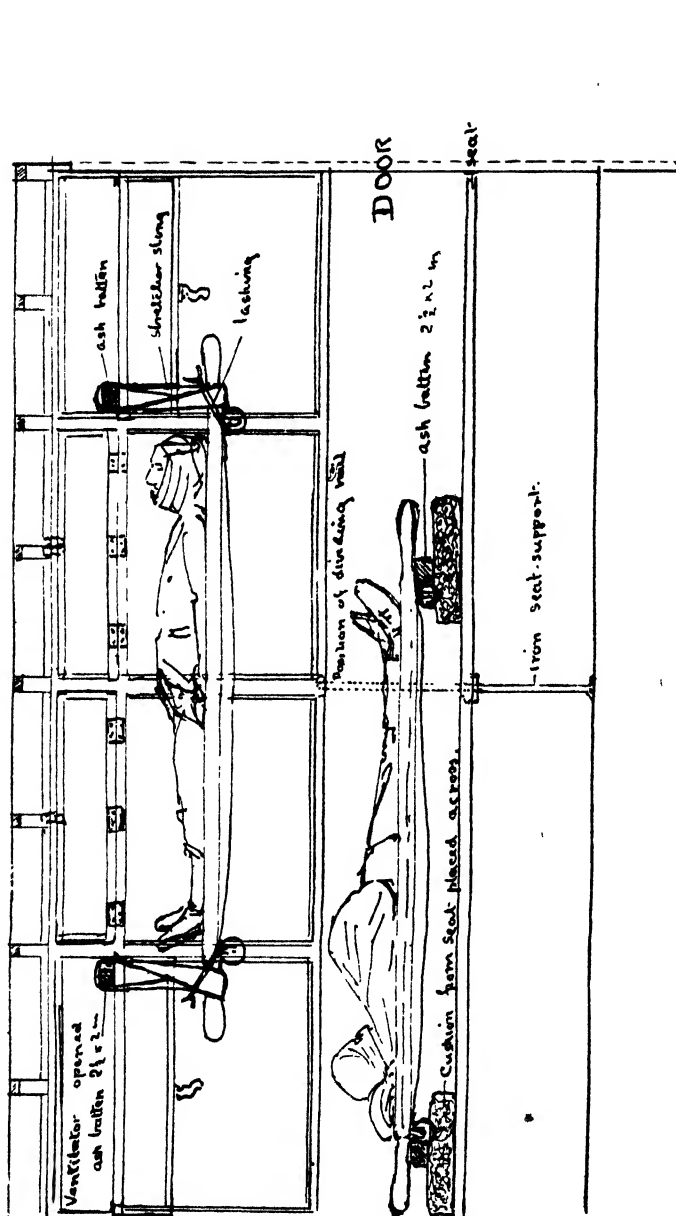
- (1) Four battens or bars of ash, or oak: Two of 4 feet 6 inches by 2½ inches by 2 inches; two of 6 feet by 2½ inches by 2 inches.

Longitudinal view of interior of motor 'bus, adapted to carry four patients lying down on stretchers. Scale,  $\frac{1}{2}$  inch to 1 foot.



Method of forming suspension loop from stretcher-sling.

Transverse view of same.



- (2) Eight 2-inch by  $\frac{1}{4}$ -inch iron screws.
- (3) Four stretchers with slings.
- (4) Twenty yards of  $\frac{3}{4}$ -inch circumference cord for lashings.

*Tools.*—Screw-wrench, a screw-driver, a  $\frac{3}{16}$ -inch gimlet, a jack-knife.

The method of adaptation :—

(a) It is intended to suspend two stretchers from transverse supporting battens or bars whose ends pass through the ventilating apertures and rest upon the frames of the apertures. The weight to be carried is two stretchers, each 35 lb. - 70 lb.; two patients say 170 lb. each - 340 lb. (410 lb.). This weight is distributed over four frames, each taking 103 lb. The frames are of 1-inch square ash, and strongly mortised into the uprights. The two end ventilators on each side are opened, the restraining straps being detached. The two longer battens are thrust through the apertures and rest on the frames near the uprights. A screw is screwed (leaving 1 inch projecting) into the underside of each batten at each end half an inch from where it cuts the outer edge of the aperture. The eight slings of the four stretchers are made into closed loops, four round each batten, by the method shown in the diagram, or supplementary loops may be formed from  $\frac{3}{4}$ -inch rope (see diagram).

(b) The two remaining stretchers are to be laid upon two transverse battens whose ends rest upon seat cushions laid across the seats. Screws should be screwed half their length into the upper faces of the batten to stop the stretchers from slipping inwards.

Lashings should be used as necessary.

(1) To steady the upper stretcher the point of purchase should be taken from the strap rails.

(2) To prevent the lower stretchers from slipping lengthways a purchase may be taken from the stanchion that supports the seat. Enough rope is allowed to form suspension loops in case slings should be wanting, four thicknesses are considered sufficient to support each pole.

*Method of Loading.*—The upper battens are to be placed in position first, and suspension loops formed. Next the lower battens are laid across the seats beneath the upper ones to form a temporary support for the stretcher. The upper tier is first loaded, commencing with the near side stretcher.

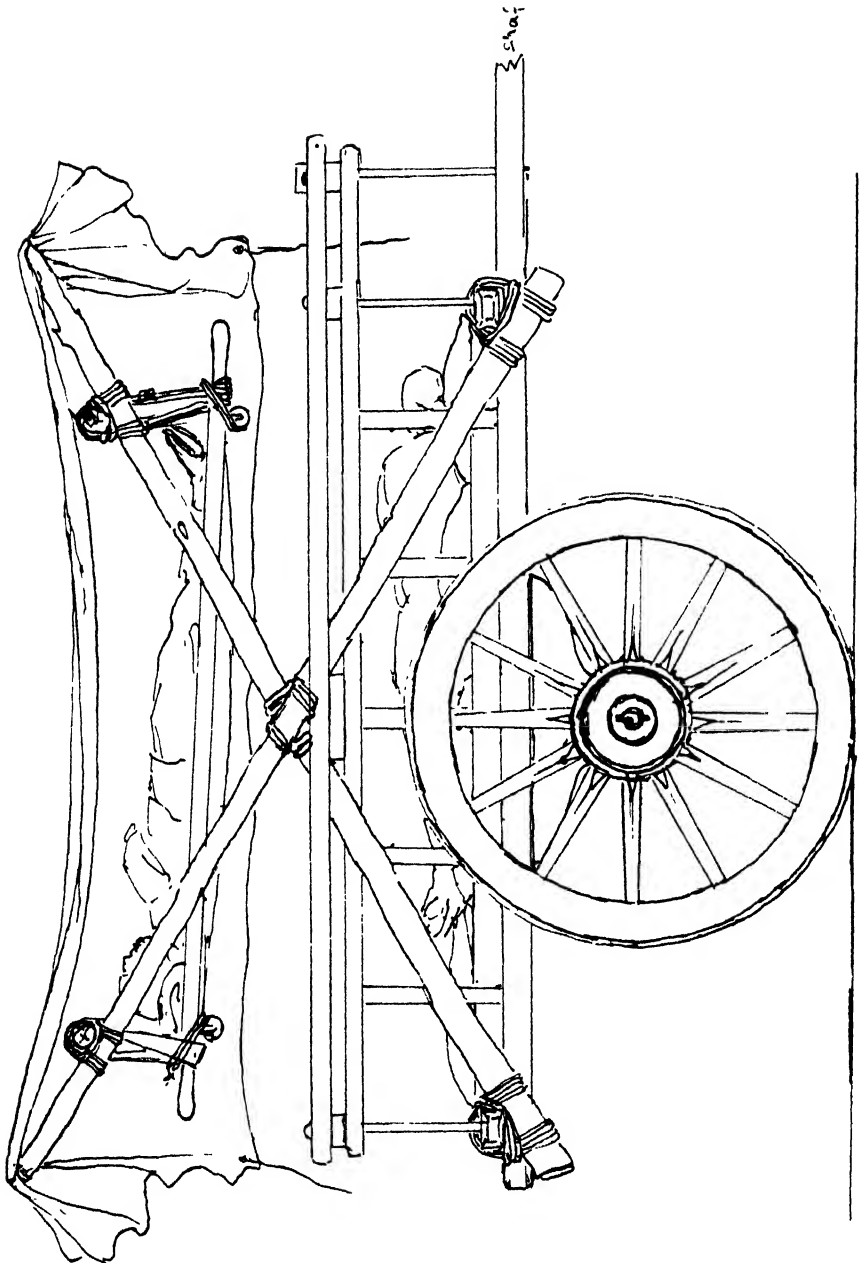
Four bearers are necessary to load. When the stretcher has been brought up to the omnibus opposite to the centre of the door, and with its long axis in continuation of that of the omnibus: Nos. 2 and 4 turn inwards, and with No. 3 take the weight of

the stretcher, and No. 1 mounts the platform. Nos. 2, 4, and 3 raise the stretcher, keeping it longitudinal until its foot clears the handrail, if the handrail has not been removed, No. 1 steadying it in this position while No. 3 disengages and mounts the platform. No. 1 now takes both the poles, and assisted by the remainder in supporting the stretcher, backs into the omnibus, and No. 2 mounting the platform, the stretcher is lifted in until the hind end of the poles clears the rail—when No. 1 and 3 bring it completely in and lay the poles upon the lower battens, No. 1 stepping over them as he backs up the omnibus. No. 2 now enters. Nos. 1 and 3 mount the seats, and raise the stretcher till its handles come opposite the prepared loops. No. 2 passes the loops over the handles and a lashing is placed under the runners and over the handles so as to secure the loop from slipping.

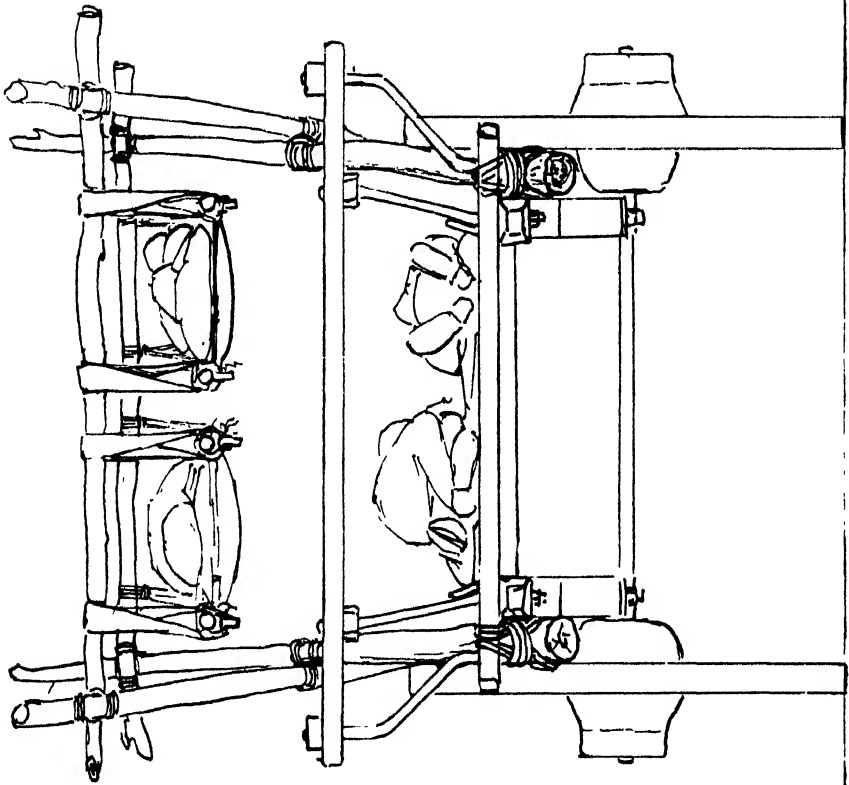
The off-side upper tier stretcher is next loaded. When this is done the lower battens are placed in their proper positions, as in diagram, on the two cushions laid across the seats—the foremost one being 9 inches from the front end of the interior of the omnibus, and the hindmost one 6 feet in rear of it. The near-side stretcher is first loaded and finally the off-side one. Some nicety of manipulation will be required in introducing the last stretcher. Room is left in the body of the omnibus for one sitting-up patient in addition to the wagon orderly. The kits and rifles can be placed on the floor of the omnibus between the seats. The top will accommodate probably ten sitting-up cases (fifteen in all).

*Note.*—The loading will be greatly facilitated by the removal of the handrail. This is mounted on stanchions secured to the steps by square-headed screws. These can be unscrewed with a screw-wrench, and the bolts which connect it with the top rail having been unscrewed, the whole comes off in one piece without damage to the vehicle.

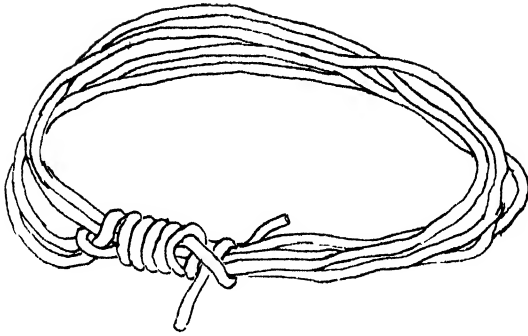
*The Scotch Haycart.*—This vehicle has been taken to illustrate the method of forming extemporised springs, as an opportunity to experiment with it occurred during the spring camp of the Medical Unit, Edinburgh University Officers' Training Corps. No originality is claimed for the method—which is German—but it has not appeared, as far as I am aware, in our ambulance books. The value of it is that it can be applied to almost any large vehicle, and the requisites for its use can be found in most farmyards. As will be seen from the diagrams, the suspensory apparatus consists of four poles, in two pairs, which are crossed about their



Scotch haycart (lateral view), adapted to the transport of wounded. Two on stretchers suspended ; two on sacks of straw on bottom of cart. Scale,  $\frac{1}{4}$  inch to 1 foot.



Scotch haycart (end view).



Suspension-loop formed from rope

centres, and rest upon a transom across the top of the cart's body, which takes the downward thrust. The lower ends pass under, and are lashed to the projecting ends of the lower transoms at the ends of the cart which take the upward thrust. Lighter transverse poles are lashed to the upper surfaces of the crossed poles, the distance between them in plan being 6 feet. Looped stretcher strings and rope (see previous examples) are placed round the transverse poles (four on each), and the stretchers are suspended from them. "Square" lashings are used. The loops are secured from slipping by lashings passed above the handles, and below and behind the runners of the stretchers. In this pattern of cart two lying-down wounded men can be laid upon the floor, but without stretchers. There is also some difficulty in getting them in as they must assist themselves.

The apparatus required is:—

(1) *For the Suspension Apparatus*.—Two stretchers with slings, 20 yards of  $\frac{3}{4}$ -inch cord (to be found in stack yards), four stack props, which are larch poles 10 feet 6 inches by  $3\frac{1}{2}$  inches, tapering to  $2\frac{1}{2}$  inches, two lighter poles of  $2\frac{1}{2}$  inches in diameter, not less than 5 feet 6 inches in length, which should be cut to length after lashing.

(2) *For the Floor of the Cart*.—Four sacks of about 3 feet 6 inches by 2 feet, 48 pounds of straw. To cover the wounded a tarpaulin of dimensions about 8 feet by 12 feet.

*Tools*.—A yard measure, a tenon saw or billhook, a jack-knife.

The particular form of cart shown happens to have every requisite for this apparatus, but it can be fitted to a farm wagon wanting in this respect, by the placing of temporary transoms. The amount of spring given is found to be very comfortable, the combination of that from the crossed poles, the transverse poles, and the stretcher handles being quite sufficient to absorb any ordinary shock. The floor accommodation is for two patients less gravely wounded. One of these carts would thus carry four wounded men—two gravely wounded and two less severely.

*The Method of Loading*.—The wounded on stretchers are first loaded, and four bearers are necessary. As in the case of the motor omnibus, the stretcher has to be raised to a considerable height, the top of the body of the cart, where it is rested and subsequently lifted until the handles can be put into the loops.

In this case two loops are formed from stretcher slings, and two from rope for each stretcher.

No. 1 bearer gets into the cart, while the remainder raise the

stretcher and place its handles upon the upper hinder transom of the body of the cart.

No. 1 takes the handles, and assisted by the remainder eases the stretcher forward until its front handles can be supported by the upper forward transom.

No. 3 now gets into the cart, No. 4 keeping the rear end of the stretcher raised, and Nos. 1 and 3 raise the stretcher to a level with the loops. No. 2 now gets up, and places the loops over the handles.

During the loading it is desirable that the shafts should be propped, and the length of the suspension loops should be so adjusted that the stretcher is horizontal. The two wounded for the floor of the vehicle are helped in in any way that is convenient.

## United Services Medical Society.

THERE was a demonstration of cases in the Library of the Royal Army Medical College on May 11th, 1910.

Major W. S. HARRISON, R.A.M.C., showed

TWO CASES OF DISSEMINATED SCLEROSIS and read NOTES ON ONE OF PRIMARY SPASTIC PARAPLEGIA.

Pensioner R., aged 41, but looks nearer 60. Patient first became ill in 1902, when, as a result apparently of strain on active service, he became thin and wasted, and was found to be suffering from general muscular weakness; he was noted at that time to show fine tremor of the hands and head, more marked on exertion; he had slight lateral nystagmus in both eyes, and both knee-jerks were increased. He was invalided in 1905 for "debility," and at the usual periodical examination for continuance of his pension he was considered to be suffering from neurasthenia. In 1909 it was noted that he had increased knee-jerks, but no Babinski sign. There was intention tremor, but no nystagmus, no inco-ordination, and Romberg's sign was absent.

In 1910 he was sent to Millbank, by order of the Chelsea Hospital Commissioners, for further observation and treatment. He was found on admission to show signs of marked senility, his age being apparently somewhere over 60 while it was really only 41. He had marked intention tremor, extreme spasticity on movement, the knee-jerks and other deep reflexes were greatly increased. Babinski's sign could not be elicited because excitation of the sole of the foot produced severe cramps in the muscles of the calf and thigh. There was no nystagmus, the pupils reacted to light and accommodation, no affection of the speech, the sensory system was apparently unimpaired, and Romberg's sign could not be elicited. But, from the history, the intention tremor, the spastic gait, the very great exaggeration of the deep reflexes, it was considered that the case was one of disseminated sclerosis. As to its causation, nothing can be said beyond the fact that it came on shortly after the South African War. There is no history of syphilis, and the patient's serum does not give Wassermann's reaction.

Private N. suffered from enteric fever in April, 1909. He had a severe attack, and while in hospital suffered from pains in the legs, described as shooting through the bones; they were sufficiently severe to keep him awake at night, but were present both day and night. His speech is stated to have disappeared to a whisper while the typhoid attack was present. He was invalided to

Wellington, and while there the pains persisted, he had considerable wasting of the legs, and pain on pressure over the calf muscles; the gait was stated to be more or less spastic. He was supposed to be suffering from "multiple neuritis." On his arrival at Millbank, on April 7th, 1910, he was found to show no signs of mental or sensory trouble and the pains had disappeared. He walked with a markedly spastic gait, but Romberg's sign was not present. The muscles showed no wasting, and power was unimpaired; the knee-jerks were much exaggerated, but Babinski's sign was not present. The electrical reactions of the muscles were normal. Patient showed marked intention tremor of the hands, and at a later date slight vertical nystagmus. There were no changes in the fundus of the eye, and the pupils reacted to accommodation and to light. There was no history of syphilis, and Wassermann's reaction was negative. The symptoms have progressed since admission to hospital.

Pensioner H. was sent to Millbank for observation by the Chelsea Hospital Commissioners. He was invalided in February, 1902, for debility following enteric fever, and since then has shown varying symptoms of spastic paraplegia, with marked signs of increased emotionalism and loss of memory. These last symptoms seem to have raised in the minds of the medical officers who examined him from time to time an impression that the patient was either hypochondriacal or exaggerating his symptoms purposely. On admission to the hospital at Millbank he was found to be markedly emotional, somewhat voluble about his symptoms, and inclined to take offence easily, so much so that he was a somewhat disagreeable neighbour. The gait was markedly spastic, and Romberg's sign was present to a certain extent; he had noted that he was apt to fall forward when washing his face. Sensation was normal, except for some slight impairment over the hands. The arms appeared to be unaffected, but the legs showed marked spasticity; there was greatly exaggerated knee-jerk, and there was slight ankle-clonus present. The plantar reflex was exaggerated, but flexor in character. He had had incontinence of urine from time to time with, at other times, precipitate micturition. At times he had lost control of his rectum, but while in hospital he had no trouble in this respect. Sexual power was said to be entirely lost.

Patient stated that at one time he had had trouble with his hands, affecting the finer movements, and that this had caused him to lose his employment as a telegraph operator. The fundi were normal, and the pupils reacted both to accommodation and to light. There was no history of syphilis, and Wassermann's reaction was negative.

The case was diagnosed as one of primary spastic paraplegia, probably secondary to the attack of typhoid fever in South Africa.

Major Harrison remarked that the cases were interesting from two points of view: first, that two of the patients dated their illness from an attack of typhoid fever; and, secondly, as showing how very varied the symptoms of disseminated sclerosis might be; the differentiation of the third case as one of primary spastic paraplegia was only a matter of the location of the majority of the lesions in the cord. Two of the patients were definitely considered to be hysterical by many of the medical officers who reported on them, and in one case this idea was encouraged by the exaggerated emotionalism of the patient, and by the fact that he varied from time to time in his symptoms, sometimes getting a little better and sometimes a little worse, as cases of disseminated sclerosis do. The third case started apparently with all the appearances of a peripheral neuritis, but, as the condition of the reflexes at the early stages of the disease was not noted in the documents received, it was impossible to say how far the diagnosis of multiple neuritis was justified.

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NOTES ON A CASE OF DYSENTERY (*TRICHOMONAS*), WITH GUMMA OF THE LIVER were read by CAPTAIN T. J. POTTER, R.A.M.C.

He said: I venture to publish the following case, as it presents some features of interest. For the clinical notes I am indebted to Captain Shea and Mr. Ranken:—

On March 26th, 1910, Private H. was admitted to the Queen Alexandra Military Hospital. He was on furlough, and stated that he had been ill for over a month, suffering from "cough, pains in the chest, and dysentery." On admission the physical signs of effusion were well marked on the right side of the thorax, and puncture at the angle of the scapula showed the presence of clear fluid with a few flakes of fibrin. The fluid on culture proved to be sterile. On the following day aspiration through the seventh intercostal space in the mid-axillary line resulted in the evacuation of twelve ounces of thick yellow pus. The eighth rib was resected and a drainage tube inserted and the cavity drained.

On the 28th he passed several stools containing blood and mucus. Microscopic examination of the stools failed to show entamœbæ, but *Trichomonas intestinalis* was present in enormous numbers, ten or twelve being in every field examined with a sixth objective. The patient's serum failed to agglutinate Shiga's bacillus, nor could this organism be isolated from the stools. The dysenteric symptoms continued in spite of the administration of ipecacuanha, irrigation

with quinine and other appropriate remedies, and the patient gradually sank and died on April 4th.

*Post-mortem* examination showed that the upper part of the right pleural cavity contained twenty ounces of clear fluid, whilst the lower portion of the cavity was obliterated, the diaphragmatic layer of the pleura being firmly adherent to the chest wall. Beneath the diaphragm and situated on the upper and outer surface of the right lobe of the liver was a large gumma which had broken down at the centre, and scattered throughout the liver were numerous smaller gummata. The colon, from within a couple of inches of the cæcum to the rectal end of the sigmoid, was studded with small circular ulcers, with sharply cut edges, raised, and not undermined; these were surrounded by an inflammatory area, and these areas, coalescing, gave the gut a deeply congested appearance. With the exception of hypostatic congestion of the left lung and some cloudy swelling of the kidneys, the other organs were all healthy.

In all the stools examined up to the time of death the trichomonas was present in enormous number. The pus from the cavity formed by the breaking-down gumma was examined for trichomonas with a negative result. It consisted of amorphous *débris*, containing no recognisable cellular elements; aerobic and anaerobic cultures on various media proved sterile.

Sections of the ulcers in the colon showed numerous bacteria, but staining by Leishman and Giemsa failed to demonstrate the presence of protozoa. This may have been due to the fact that permission to hold the necropsy was not obtained from the relatives till thirty-six hours after death, and decomposition had set in. Examination of the gummata showed them to consist of granulation tissue, but staining by the silver method failed to show the *Treponema pallidum*. He had no entry for syphilis during his five and a half years' service.

The absence of entamœbæ, failure to isolate Shiga's bacillus, and the negative result of the agglutination test make it, I think, probable that the pathogenic organism was in this case the *Trichomonas intestinalis*; further, the *post-mortem* appearances of the bowel corresponded neither with those of amœbic nor bacillary dysentery. Such cases have been described by Braun ("Animal Parasites of Man," p. 48).

NOTES ON A CASE OF CONGENITAL ACHOLURIC ICTERUS were read by Lieutenant G. H. DIVE, R.A.M.C.

He said the patient is a man aged 25. His general health is apparently good. The chief points in his condition are:—

(1) *Jaundice, appearing in Infancy and Persisting*.—I can obtain no record of jaundice in other members of the family.

(2) *Variability in the Depth of the Jaundice*.—This is well shown in this case, and the intensity undoubtedly varies inversely as the number of erythrocytes.

(3) *Splenomegaly*.—The spleen reaches one inch below the umbilicus; it is not tender.

(4) *Oligocythæmia*.—On admission to the Queen Alexandra Military Hospital two months ago his erythrocytes numbered 2,500,000 per c.mm.

(5) *Anisocytosis*.—Irregularity in size of the red cells is marked.

(6) *Diminished mean Diameter of the Red Cells*.—The average diameter has increased under treatment from  $5.9\ \mu$  to  $6.3\ \mu$ .

(7) *Absence of Bile in the Urine and Presence of Bile in the Fæces*.—Even when deeply jaundiced no bile could be demonstrated in the urine, and the fæces were the normal colour.

Among other points shown by him are polychromatophilia, punctate basophilia, and the frequent occurrence of nucleated reds. The colour index varied from 1.2 on admission to 0.9 (May 1st, 1910). There are no special changes in the leucocytes.

*Progress in Hospital*.—During the first week his red corpuscles sank to 1,800,000 per c.mm. with a proportionate drop in the percentage of hæmoglobin, the jaundice increasing and reaching its maximum one week later, at which time he was somewhat liverish. Since then his red corpuscles have increased in number to 4,500,000 per c.mm., and the hæmoglobin to 90 per cent., a maximum point reached one week ago. In the last seven days there has been a slight drop in both, more marked in the case of the hæmoglobin percentage, and it will be of interest to note whether the jaundice increases accordingly. His weight has increased 1 stone in the last two months.

I was never able to satisfy myself as to the presence of bile pigment in the blood, nor as to the increased liability to hæmolysis of the red cells.

The treatment adopted was internal medication with iron and arsenic, with local application of X-rays to the spleen. The prognosis is fair, such a condition not being incompatible with longevity.

As regards the pathology, it is surmised that there is an initial imperfect development of the bone-marrow, with resulting inferiority of the red cells, which yield readily to any hæmolytic influence.

## Clinical and other Notes.

### A CASE OF MULTILOCLAR CYST OF THE PANCREAS: OPERATION AND RECOVERY.

BY CAPTAIN H. C. SIDGWICK.  
*Royal Army Medical Corps.*

GUNNER G., aged 23, was admitted to the Military Hospital, Port Royal, Jamaica, on October 29th, 1909, complaining of pain in the abdomen.

*Past History.*—His medical history sheet showed that he had received treatment for gastritis in hospital in August, 1909.

*History of Present Condition.*—The patient stated that he had had slight abdominal pain for several days, but that it had not interfered with the performance of his duty.

*Condition on Admission.*—Patient did not look ill, nor did the pain in the abdomen seem to be intense. Tongue clean; temperature, 99° F.; pulse 80. Heart: apex beat was to be felt in the nipple line, in the third interspace; highest limit of cardiac dulness was at the upper border of the third rib. Lungs: a few fine crepitations were audible over the base of the right lung. Liver: the upper limit of the liver dulness was on a level with the lower border of the fifth rib. The thoracic organs and liver were thus found to be slightly displaced upwards, presumably by an increase of the intra-abdominal pressure.

Abdomen: There was no marked distension, but a fulness in the umbilical and epigastric regions. On palpation, a considerable mass was discovered in the epigastric and umbilical regions, extending laterally to both right and left hypochondriac regions. The tumour did not appear to be very tender, and was dull to percussion, there was, however, a band of resonance between it and the liver. There was no tenderness or tumour at MacBurney's point. The patient stated that his bowels had not been satisfactorily opened for ten days, but the obstruction had not been absolute. Urine: Specific gravity 1028; acid; no albumin or sugar.

This was the condition of affairs on admission, viz., 10 a.m. The patient was placed on a milk diet. At 6 p.m. he was seized with an attack of extreme pain in the abdomen and vomiting. The vomitus at first consisted of the contents of the stomach, and then became bilious and dark green in colour. The tumour in the abdomen was more obvious and was extremely tender. Pulse 90; temperature 98° F. Two enemata were administered during the evening, which brought away a few scybala. Fomentations were applied to the abdomen, and

morphia  $\frac{1}{4}$  gr. was given hypodermically, as the pain was so intense. This slightly relieved the pain, but the patient scarcely slept at all during the night.

On the morning of the 21st the patient was still suffering pain so intense as to cause him to writhe in agony. Pulse 98; temperature 97.6 F. During the night he had vomited a large quantity of dark green fluid. Rectal examination supplied no further information, the rectum was empty, and nothing abnormal was to be felt. The abdominal tumour had markedly increased in size.

A provisional diagnosis of acute intestinal obstruction was made and the patient prepared for operation.

*Operation.*—At 4 p.m., on October 21st, patient was anæsthetised with chloroform. When he was under the anæsthetic a large and prominent tumour was plainly visible in the middle of the abdomen, its lower limit being about two inches below the umbilicus.

An incision was made below the umbilicus and slightly to the left of the middle line. On opening the abdomen, the conical end of a tumour, about the size of a cocoanut, presented in the wound. The tumour was covered with normal peritoneum and moved slightly with respiration; it was elastic and extremely tense. The incision was enlarged upwards, and it was then found that the hand could be passed under the tumour at its apex or lower end, while above, the tumour was firmly attached to the upper and posterior part of the abdomen. The general peritoneum appeared normal and the intestines collapsed. The intestines were packed off with gauze strips and an incision made into the tumour; a considerable quantity of thickish brown fluid escaped under high pressure. The finger could then be passed into an irregular cavity with a rough lining. Several other incisions were made and more fluid evacuated from other similar cavities; in all about a pint of fluid was obtained.

When the fluid had been removed, there was left the peritoneal investment containing the remains of the tumour, which felt granular, being apparently riddled with small bodies about the size of a grain of barley. The tumour was quite irremovable, being firmly attached to the upper and posterior portion of the abdomen. The peritoneal covering appeared to be continuous with the meso-colon. The edges of the incision in the peritoneum covering the tumour were stitched to the parietal peritoneum at the upper end of the wound and the rest of the wound closed. The cavity thus left at the upper end of the wound was packed with gauze and dressings applied.

The tumour was apparently a multilocular cyst of the pancreas, which had reached the abdominal wall below the stomach, possibly having developed between the leaves of the transverse meso-colon.

The patient stood the operation well, and slept for several hours after recovering from the anæsthetic. He was then given  $\frac{1}{4}$  gr. of morphia. He took some small quantities of albumen water and retained them.





Skullgram (a)



Skullgram (b)

To illustrate "Sub-periosteal Resection of the Elbow-joint."  
By Captain S. G. BUTLER, R.A.M.C.

On the 22nd the wound was dressed; the gauze plug, removed with difficulty, was replaced by a drainage tube. Patient took small quantities of beef-tea, albumen water, and stimulant frequently during the day. Temperature 99·8° F.; pulse 82. For the next three days his condition occasioned considerable anxiety, as he had several attacks of abdominal pain; this was relieved by morphia. He took nourishment well, however, and his pulse remained of good quality. On October 25th he was given a simple enema, which produced a good motion. After this he had no more pain. The wound was dressed daily; the lower part healed by first intention and the upper part granulated up. On November 8th, only a small sinus  $\frac{1}{2}$  inch long was left at the upper end of the wound, and the patient was up and on ordinary diet, his bowels being open naturally every day. He felt quite well. The original tumour felt on admission had quite disappeared; there was some resistance at the site of operation, probably due to adhesions.

Particular points of interest connected with this case:—

- (1) The sudden onset of serious symptoms, closely resembling those of acute intestinal obstruction.
- (2) The rapid increase in the size of the abdominal tumour, accompanied by intense pain.
- (3) The probable existence of the tumour for some time without the production of symptoms.

## SUB-PERIOSTEAL RESECTION OF THE ELBOW-JOINT.

By CAPTAIN S. G. BUTLER

*Royal Army Medical Corps.*

PRIVATE S., of the Carbineers, was admitted to the military hospital at Roberts Heights, Pretoria, with a view to his appearing before an Invaliding Board.

The history of his case, as far as it could be ascertained from his medical history sheet was as follows: Six months previously, in India, he had met with an accident which resulted in a severe fracture of the lower end of the humerus, an operation had been performed and the internal condyle wired. On his regiment being transferred to South Africa a few months later, he was sent with it, and soon after his arrival in this country he was sent to Pretoria to be invalided out of the Service. When seen by me he had firm bony ankylosis of his left elbow-joint.

The elbow was fixed at a right angle. No movement could be obtained in any direction.

Skiagram (a) taken at the time shows this condition well. On December 2nd, 1908, I resected the elbow-joint sub-periosteally. The periosteum stripped easily, and little difficulty was met with in preserving it intact. The arm was put up at a right angle on a jointed internal

angular splint. Passive movement was commenced at the end of ten days and active movements and massage a week later. Two months after the operation the patient was discharged from hospital with a quite useful arm. Movement was free in every direction. He was able to lift a chair with his left hand, hold it out at full length, and slowly flex and extend the forearm. Pronation and supination were unimpaired.

Skiagram (*b*) show the conditions at this time. It will be seen that a good deal of new bone has formed in the periosteum, but this does not interfere with free movement of the joint. Twelve months after the operation a skiagram was kindly taken for me by Major Forde, at Bloemfontein, where the man is now stationed. It shows that very little further deposit of new bone has taken place during the ten months which have elapsed since the second skiagram was taken.

Major Forde reports on his condition at the time as follows:—

"Private S. has been able to perform all his duties since his return to his regiment nine months ago.

"His arm is quite strong. There is very slight limitation of complete extension, but otherwise movement in every direction is free."

I venture to record this case because I think the fact that so useful an arm can be obtained after a sub-periosteal resection of the elbow-joint is, perhaps, not generally appreciated.

### A CASE OF SINGLE KIDNEY.

BY CAPTAIN H. F. GOTTLIE.

*Royal Army Medical Corps.*

I AM reporting this case as I believe the condition is uncommon.

The patient, Patrick C., was a stoker in the Navy, aged 30, with nine years' service. He was admitted to the Military Hospital, Colombo, on December 17th, 1909, with acute cardiac dilatation, dating from December 4th, when his ship was coming through the Red Sea. He died on December 21st.

The kidney was situated in the right loin in the normal position except that its lower end extended downwards to a greater distance than usual, but neither extremity lay across the anterior surface of the vertebral column. Its dimensions are: Length, 6 inches; greatest width of anterior surface,  $2\frac{7}{8}$  inches; weight  $10\frac{1}{2}$  ounces. The capsule stripped easily. The cortex to base of pyramids measured 10 mm. and appeared healthy. There were two aberrant renal arteries, one situated above and the other below the main vessel.

On December 17th 54 ounces of straw-coloured urine (sp. gr. 1018, containing no albumin) were passed in twenty-four hours. On December 18th 55 ounces, and on December 19th 36 ounces; this was measured, some being passed involuntarily.

No sign of a second kidney could be felt on the posterior abdominal wall of left side, or anywhere else in abdominal cavity. The spleen, liver, and pancreas appeared healthy and normal in size. The *post mortem* was done in the evening with the intention of simply examining the heart, but wishing to demonstrate the effect of the back pressure upon the other organs, I removed them, finishing with the kidney, when the light was insufficient to make a dissection of the ureter and renal vessels.

## THE RADICAL CURE OF INGUINAL HERNIA.

BY LIEUTENANT-COLONEL R. W. WRIGHT, R.A.M.C.

*Royal Army Medical Corps.*

DURING the last six years a number of operations for the radical cure of inguinal hernia have been carried out in the Royal Arsenal Hospital, and I have now records of 100 cases, each of which I have examined two or more years after the operation. Considering the difficulties in the way of following up similar cases in the Army for a sufficiently long period, the results in this series of cases appear to be of sufficient interest to justify record.

Up to January 14th, 1908, 120 of these operations had been performed and of these it has been possible to examine 100. Of the 100 examined 88 remain sound, while 12 have relapsed. Of the 12 relapses 11 occurred in the first 40 of the series, whereas in the last 60 there has been only one recurrence (1·6 per cent). Any bulging, however small, in the inguinal region operated upon has been counted as a relapse. In 4 of the 12 this bulging was so small that the patient was not aware of its existence and suffered no inconvenience. In none of 88 successful cases has a truss been worn since the operation, and in each case the man has been at full work since his return to duty after the operation. Many of these men (hammer-men, fitters, &c.) have very laborious work and it is satisfactory to know that such successful results can be obtained. The ages, at date of operation, varied from 14 years to 59, and the patients were in no way selected—any man desirous of relief being operated upon.

It may be suggested that the larger number of the recurrences in the first 40 cases is to be explained by the greater lapse of time since they were operated on; but this is not so, as in every case but one, when relapse took place, this occurred in less than two years after the operation. I have known relapse to occur 14 years after operation, but this is, I think, very exceptional, and, for practical purposes, a hernia which does not recur within two years may be said to be cured. The more successful results in the latter part of the series must be attributed to the improved technique resulting from practical experience.

# SURGICAL OPERATIONS PERFORMED AT THE MILITARY HOSPITAL, EDINBURGH, DURING THE YEAR 1909.

BY CAPTAINS J. B. CLARKE AND E. G. FFRENCH.

*Royal Army Medical Corps.*

The following are the chief operations performed :—

Operations	No of cases	Successful	Partially successful	Failed	Died
<b>ABDOMEN—</b>					
Hernia, radical cure .. ..	10	10	..	..	..
Excision of appendix .. ..	3	3	..	..	..
For appendix abscess .. ..	1	1	..	..	..
Abscess of liver .. ..	3	2	1	..	..
Fibroma of omentum .. ..	1	1	..	..	..
<b>VEINS -</b>					
Excision of varices .. ..	4	4	..	..	..
<b>MALE GENERATIVE ORGANS—</b>					
For varicocele .. ..	4	4	..	..	..
Stricture of urethra .. ..	1	1	..	..	..
<b>RECTUM AND ANUS—</b>					
Hæmorrhoids, &c. .. ..	3	3	..	..	..
Tendons .. ..	1	1	..	..	..
<b>AMPUTATIONS—</b>					
Of toe .. ..	1	1	..	..	..
Of thigh (for sarcoma) .. ..	1	1	..	..	..
<b>FOREIGN BODY—</b>					
In wrist (needle) .. ..	1	..	..	1	..
Cyst (congenital of neck) .. ..	1	1	..	..	..
<b>FRACTURES</b> .. ..	2	2	..	..	..
<b>MASTOIDITIS—</b>					
Suppurative .. ..	1	1	..	..	..
<b>ABSCESSSES—</b>					
Of neck .. ..	1	1	..	..	..
Of thigh .. ..	1	1	..	..	..
Of middle ear .. ..	1	1	..	..	..
<b>HYPERTROPHY—</b>					
Of tonsils .. ..	1	1	..	..	..
<b>OSTEOTOMY—</b>					
Genu valgum .. ..	1	1	..	..	..

## NOTES ON THE OPERATIONS PERFORMED. BY CAPTAIN E. G. FFRENCH.

*Radical Cure for Hernia.*—In all cases a modified M'Ewen's radical operation was done.

Of the seven cases of inguinal hernia, one was recurrent; four were single acquired; and two were congenital.

One of the congenital variety was of interest. He was admitted to hospital suffering from strangulation, and there was also evidence of a large congenital hydrocele. On examination of the scrotum the right testicle was absent. By means of a trocar and cannula the fluid of the hydrocele was drawn off after the usual incision over the inguinal canal had been made. The right testicle was found lying in the inguinal canal in a state of atrophy; the cord was ligatured and the testicle removed. The strangulated loop was found to be distended with gas, and there was

well-marked venous congestion. The sac and its contents were irrigated with hot saline solution, and then the constricting agent at the neck divided. A modified McEwen's operation was performed as a radical cure. The wound healed by first intention.

A small hæmatoma occurred in one of the remaining cases, the rest healed by first intention.

*Laparotomy for Appendicectomy and Appendix Abscess.*—In two cases the appendix was removed, and in one a large retrocæcal abscess was drained. This case was in a desperate condition, and on making the usual McBurney's incision the appendix was found to be firmly bound down to the surrounding structures. It was thought advisable to leave it. The abscess was evacuated and drained. He made a good recovery and has been discharged to duty.

In one of the two appendicectomies, the appendix measured  $6\frac{1}{2}$  inches and dipped well over the edge of the pelvis. A good many adhesions had to be dealt with. This case developed hypostatic pneumonia five days after the operation. There was much cough and the wound broke down and suppurated after the tenth day. The wound was allowed to granulate, but a small fæcal fistula formed which took several months to heal.

The other case showed a greatly inflamed appendix which was kinked, and there was also a large retrocæcal abscess; this was drained and the patient made a satisfactory recovery.

All three cases had suffered from previous attacks.

*Liver Abscess.*—One liver abscess was drained through the abdominal wall. It was found by an exploratory puncture in the lower part of the right lobe. The abscess was an acute one, containing about a pint of pus. He made an excellent recovery.

Another case was one of long standing which had ruptured through the diaphragm into the lung before his admission to hospital. An exploratory puncture found pus, and the needle was cut down upon in the mid-axillary line. Two inches of the ninth rib were removed and a biflange rubber drainage tube inserted. The drainage was slight and the patient continued to expectorate liver pus. The wound has healed; but he is still in hospital, as the expectoration continues—though in a smaller amount.

*Varicocele.*—The high operation was performed in all three cases, and the results were entirely satisfactory—healing by first intention took place in every case.

The external oblique aponeurosis is slit up and the veins excised; the proximal and distal ends of the veins are then united. The aponeurosis is then sutured and the wound closed. I always insert a small rubber drainage tube at the lower angle of the wound for the first twenty-four hours.

*Hæmorrhoids.*—One of the cases suffered from a fissure *in ano* as well. The piles were ligatured and removed, and the fissure repaired and

sutured. He made a satisfactory recovery and was discharged to duty a month after the operation.

*Amputation.*—This man was sent from an out-station for operation as he was thought to be suffering from an abscess in the upper end of the tibia. An exploratory incision was made over the swelling, and on examining the bone it was found to be devoid of periosteum and presented sharp spicules. There was a good deal of hæmorrhage, and soft masses could be easily removed. I suspected sarcoma and the diagnosis was confirmed by a pathologist, who prepared and examined a piece of the tissue which I removed from the wound. He found it to be a mixed celled sarcoma. On the receipt of this news the patient was prepared and on the following morning an amputation (Spence's) was performed at the lower third of the femur. The wound healed by first intention and the patient put on a stone in weight.

*Abscesses.*—(Middle Ear Disease.)—The patient was admitted to hospital with a slight discharge from his right ear, a high temperature and intense pain in the middle ear. It was found on examination that there was a small rupture of the tympanic membrane. He was given an anæsthetic, and by means of an ear speculum and a long narrow-bladed knife I enlarged the opening in the tympanic membrane and there was immediate free discharge of foul-smelling pus. By means of a narrow strip of gauze, good drainage was kept up, and in ten days the discharge had completely stopped. His temperature remained about the normal, and there was marked dullness over the left side of the chest. Fluid was found on passing an exploring needle, and 18 ounces of blood-stained fluid were aspirated. Shortly afterwards he began to cough and expectorate—the sputum was examined and a few tubercle bacilli were found—this was confirmed at a later date. The dullness on the left side and the elevated temperature continued, and on making another exploration pus was discovered. He was operated upon and 2 inches of the eighth rib were removed in the mid-axillary line. About a pint and a half of pus was allowed to evacuate slowly and a biflange rubber drainage tube inserted. The cavity was not irrigated and the drainage has been satisfactory. He is still in hospital.

NOTES ON THE OPERATIONS PERFORMED. BY CAPTAIN J. B. CLARKE.

*Abdomen.* (Appendicectomy.)—On the usual McBurney's incision being made, and the peritoneal cavity opened, the appendix was found to be firmly bound down by adhesions to the surrounding structures, and there were several encysted abscesses. The appendix was separated from the adhesions, which were ligatured and divided and the appendix removed. The abscesses were evacuated, and the pus in the cavities mopped up with gauze pads. The wound was packed with strips of iodoform gauze and allowed to granulate. At the end of two months the wound had completely healed with the exception of a small sinus, which closed after a few applications of silver nitrate. He was sent to the convalescent home for a month, and returned to duty at the end of that time.

*Fibroma.*—This patient was admitted suffering from pain and swelling in the right iliac region. An exploratory incision was made over McBurney's point and the peritoneum opened. On the cæcum and appendix being examined an extensive growth was found about them. There was no evidence of abscess formation. A small piece of the tumour was excised and the wound closed layer by layer. The pathologist who examined the specimen reported it to be an innocent tumour, a fibroma. At the operation numerous adhesions were broken down. The patient before the operation had suffered from a good deal of pain for some months, but the pain disappeared after the operation; it was no doubt due to the adhesions to the cæcum and appendix. The wound healed by first intention, and patient put on nearly 2 stone in weight. He has been seen twice during the past six months, and has kept well ever since; he is able to do his duty.

*Liver Abscess.*—This case was operated on two years ago on his return from India. The abscess reappeared, and 2 inches of the eighth rib in the hind axillary line were removed and the cavity drained. He made a satisfactory recovery and returned to duty.

*Suppurative Mastoiditis.*—This boy was admitted to hospital suffering from a middle ear discharge. After a few days in hospital he complained of pain over the mastoid process, and on inspection swelling and redness over the process could be seen. The usual incision was made behind the ear down to the bone, the ear was pulled forward, and the periosteum detached. A modified Ballance operation was done, the mastoid cells were opened, the pus evacuated, and the cells packed with iodoform gauze. The wound granulated satisfactorily, and he was sent to the convalescent home at the end of two months. The middle ear condition cleared up, and the hearing was fairly good when he was discharged.

*Osteotomy.*—A young bugler was admitted to hospital suffering from genu valgum of the left limb. It spoilt his otherwise smart appearance, and he was anxious to have it put right. McEwen's osteotomy was performed, the femur being divided above the condyles. The limb was brought into a straight position and placed on a back splint. At the end of three weeks the whole limb was enveloped in plaster of Paris bandages. At the end of two months the plaster of Paris was removed, and it was found that good union had taken place—the limb being nearly as straight as the other. He was made to sit on a table and bend the knee-joint gradually over the edge, the weight of the leg being sufficient to bend the knee. In a fortnight he was allowed to walk about freely, and the result was most satisfactory. The shortening was slight.

*Fractures.*—(1) A case of wiring of the right olecranon. This man fell on his elbow and fractured the olecranon. A longitudinal incision was made over the back of the elbow-joint, and the two fragments were united with silver wire. He made an uninterrupted recovery, and was

sent to the convalescent home twenty-six days afterwards with good movement of the elbow.

(2) This was a man who sustained a fracture of the right radius about the bicipital tubercle. The arm was X-rayed and a good photograph was developed. It showed a fracture about the bicipital tubercle with a good deal of comminution. This fracture was caused by indirect violence, the patient falling on his hand. It is of great interest, as it is extremely rare for such a fracture to take place caused by indirect violence. The case was shown to Professor Caird and other surgeons of the Royal Infirmary, Edinburgh, who expressed the same opinion. It was hoped that the fragments could be wired, but on cutting down on to them the upper part was found to be comminuted; it was removed. The man was a muscular subject, and before he was discharged from hospital to duty there was good movement, supination and pronation being satisfactory.

*Foreign Body in Wrist.*—This patient was admitted to hospital with a history of having accidentally driven a needle into the lower part of the left forearm immediately above the wrist. An X-ray photograph was taken and the depth ascertained by MacKenzie Davidson's method. He was prepared for an anæsthetic, and an incision made over the line of the needle, but the operation had to be abandoned before the needle could be found, as the patient had severe hæmatemesis and became collapsed. The wound healed by primary union, and he was discharged to duty. The needle did not give further trouble.

*Stricture of Urethra.*—The patient was admitted with a history of increasing stricture for five years. On examination a tight stricture was found immediately in front of the triangular ligament. Internal urethrotomy was performed, and a No. 12 catheter passed daily. At the end of three weeks a No. 12 catheter could be passed without difficulty; he was then discharged to duty.

*Division of Tendons.*—The patient was admitted suffering from a division of the tendons of the flexor sublimis and flexor profundus of the left ring finger, the result of falling on a broken bottle. An incision was made over the wound and the tendons exposed. The upper parts of the tendons had retracted so much that it was found impossible to approximate them to the lower. The lower divisions of the tendons were then anastomosed to those of the middle finger. The wound healed by first intention, and he had good movement in the ring finger before he was discharged to duty.

## THE TREATMENT OF ORIENTAL SORE.

BY LIEUTENANT W. G. AVISS.

*Royal Army Medical Corps.*

IN the article on this condition in Allbutt's "System of Medicine" (1907), by Lieutenant-Colonel Firth, R.A.M.C., one finds:—

"The ulcerative stage may last for months, the indolent nature of the sore and its intractability to treatment being characteristic."

This all depends on the treatment adopted. Of the intractability when the usual methods are adopted there is no question, and this is exemplified in the two cases here mentioned. That healing is rapid and complete if the treatment devised by Mr. C. J. Lincoln, of the Indian Service Medical Department, is used, is clearly shown by the same two cases.

Gunner C. came under my care in Quetta, where the disease is very common, early in October, 1909. He then had a typical Oriental sore on his left forearm, about an inch in diameter, round, with raised edges, the floor covered with feeble granulations, and exuding much pus. The pus tended to form a scaly scab over the ulcer, and from under the edges of this scab pus exuded.

When the scab was removed the ulcer was just as it had been before the scab formation. The ulcer had been in this condition for nine months, and the patient had been under treatment all the time.

Gunner W., who came to me at the same time, presented an almost exactly similar sore, the situation, on the right leg just below the knee, alone being different. He had had this for two months, and also had been treated all the time in hospital.

The sores were cleaned up by wet dressings, and an ointment of quin. sulph. (10 per cent.) was applied. This treatment was continued for three weeks without the slightest benefit.

I then tried painting with tincture of iodine. This did no good.

Other ointments of an antiseptic nature (*e.g.*, nitrate of mercury) of varying strengths were tried. They did no good at all.

Towards the end of November, as there was absolutely no improvement, the ulcers were thoroughly scraped with a Volkmann's spoon and pure carbolic acid was applied. After this the ulcers were dressed twice daily with warm boric fomentations. In a week's time they were in exactly the same condition as before the scraping.

They were scraped again and treated with carbolic acid twice in December. There was no improvement at all.

Thus, after three months, in spite of all the usual text-book treatment, there was not the least improvement.

Early in January, 1910, Mr. C. S. Lincoln, I.S.M.D., asked me to try an application he had devised.

This consists of a dark green fluid prepared from a very dark green gummy exudation dried in and mixed up with the leaves of the tree from

which it is obtained. It is called "rausath"—as far as I can imitate in English the native pronunciation—and is sold by native grocers in the Bazaar.

The fluid is painted over the sore and allowed to dry. No dressing is put over the dried paint. Every day a fresh coat is painted over the old one.

In a variable time a scab consisting of dried pus, epithelial and connective tissue, *débris*, and dried paint, comes away, leaving a perfectly healed scar. In the two cases under notice this pleasing result occurred after fourteen and sixteen days respectively.

Mr. Lincoln, to whom any credit there may be for the treatment belongs, tells me that this invariably occurs, and that he has not met with a single instance where it has failed.

Should this method prove as beneficial in other hands it will not be necessary in future to remove patients from the endemic area to the hills, as recommended by Lieutenant-Colonel Firth in his article on Oriental sore, and the number of morning sick will be considerably decreased in many Indian stations.

### ANGIO-NEUROTIC ŒDEMA WITH A RECORD OF TWO CASES.

BY CAPTAIN C. R. SYLVESTER BRADLEY.

*Royal Army Medical Corps.*

THIS disease is so seldom met with in the Service that I feel sure a report on two cases which have come before my notice during the past two years may be of some slight interest.

The occurrence of transient vascular phenomena such as periodic flushings, erythematous patches, urticaria, *tache cérébrale*, &c., have long been recognised as connected with patients of neuropathic or hysterical tendencies, and especially in women at times when the vaso-motor system is unbalanced or upset, as for instance, the menstrual period and climacteric. In 1892 Bauke drew attention to a "circumscribed œdema," which sometimes occurred suddenly in patients with some neuropathic tendency, in which the œdema was painless, and subsided after a day or so, leaving no bad results. It is this "circumscribed œdema," or, as I think more suitably termed, "angio-neurotic œdema," that my two cases illustrate. My first case is not of any particular interest, as my notes are only of the briefest, and would doubtless never have been published had not Case 2 occurred.

Case 1.—Hospital Assistant, I.S.M.D., aged 27, reported sick on April 3rd, 1907, with an œdematous condition of the left side of his tongue and adjacent cheek; it was quite painless, and had "come on" suddenly during the night. He had never had it before. On examination some

badly decaying stumps on the same side as the swelling were thought to be the probable cause, and were extracted.

On April 4th he again reported sick with an œdematous swelling involving the whole of the left side of the face and left eye, the œdema round the eye being so great that he could not open it. The condition was still thought to be the result of the dental trouble, and he was given a smart purge and told to report sick the following day.

April 5th.—Swelling almost disappeared; says he feels quite well and would like to do his duty.

April 7th.—Reported sick again with practically an identical swelling on the right side of the face; there were no carious teeth on this side, and as the left side of the face was now normal I began to look for other causes of the œdema, but without result. All his organs and excretions were normal, there had been no error in diet, and no local irritation to account for the œdema. As the man left the station the following day I was unable to follow the case up, and these notes were completely forgotten until No. 2 occurred some two years later in England.

*Case 2.*—Private William C., of the 3rd Battalion Essex Regiment, reported sick on December 15th, 1909, with a swelling of the left side of his face. He stated that about a fortnight before he woke up one morning with the left side of his tongue swollen, the swelling disappearing about dinner-time the following day. That evening his upper lip swelled, which also disappeared the following day; he was then clear from "swellings" until he noticed his face was swollen that morning. On examination the œdema involved the whole of the cheek on that side, and as he had a bad carious tooth this was extracted, and he was returned to duty, no credence being placed on the first part of his story.

On December 19th, 1909, he again reported sick with the whole of the lower part of his face swollen from the level of the *alæ nasi* downwards. His teeth were again examined and some decaying stumps extracted. He was given a purge and formalin mouth-wash, and again returned to duty.

On December 23rd, 1909, four days later, he reported sick with œdema of the left eyelid, and as he could not see out of this eye he was told to attend, and some interest was attached to his case.

The following day both eyes were so surrounded by œdema that he could hardly see at all. His urine and heart were very carefully examined but with a negative result. When seen the next morning the swelling had completely disappeared, and there was nothing to show that he was not in perfect health. Three days later his left arm was swollen, hot, and red, the circumference of the forearm measuring 3 inches more than the right; this arm had regained its normal condition by the following evening.

Four days later both of his feet were so affected that he could not get his boots on.

On January 1st, 1910, he was admitted to hospital with œdema round his right eye.

On January 3rd both his knees were considerably swollen, and the following evening his right eye was again affected.

Since his admission to hospital the onset of the œdema had been carefully noticed, and this in every case occurred at night, and reached its height in about six hours time, after which the swelling gradually subsided, all œdema disappearing about eighteen to twenty-four hours after its onset.



Showing œdema of left eyelid and cheek.



Showing œdema of left cheek.

The onset of the œdema was evidenced by a slight burning sensation with stiffness of the part affected, and a slight erythema of the skin. While in hospital he had been given tonics, calcium chloride, nitroglycerine, potassium iodide, &c., and a careful enquiry was made into his personal history, but with a negative result. He was now clear from all œdema for a week, and was to be discharged to duty again, when without any warning œdema started again in his left foot, and two days later his right arm was affected.

On January 19th, 1910, his throat and tonsils were so considerably swollen that he could only swallow and breathe with difficulty, and tracheotomy instruments were in readiness in case an operation should

prove necessary. The œdema in this case, however, disappeared in a few hours. After this he was again free from all œdema for some eight to ten days and at his own request was discharged hospital to attend daily. He is still attending hospital, and every three or four days some part of his anatomy is affected with œdema, and I see no prospect of his getting better unless he does so spontaneously.

A curious point to notice in these two cases is their both starting with or being complicated with dental irritation, which led to the extraction of teeth, also the lack of any definite neuropathic history in either case. In case No. 2 the family history is not very clear; the father is said to have died from "brain collapse" after influenza, and the mother is said not to have been too sound in her head; but the patient himself is a robust, intelligent youth, rather above the average recruit in intellect. He has two brothers and three sisters, all of whom are reported to be healthy.

It is also interesting to contrast these two cases with others that have been reported in the last few years.

Five cases of "circumscribed œdema" were reported in the *Journal of Neurology* of 1903, by Ernest Wills and Dudley Cooper; in all these cases the patients were free from any organic disease which could have had any influence at all on the production of this condition. The temperature was not raised, the œdema was painless and the general health was undisturbed; in every one of these five cases, however, there was some marked neuropathic lesion accompanying the condition, and the authors consequently considered themselves justified in concluding that among the chief predisposing causes should be placed hysteria, hysterio-epilepsy, neurasthenia, and such-like emotional states.

First among the exciting causes they placed psychical disturbances, and in this opinion they seconded the opinion of such authorities as Bauke, Charcot, Kussner, Bitôt, and others.

Max Joseph records three cases occurring in dipsomaniacs and gives as exciting causes the climacteric, the onset of puberty, exhaustive nervous drain, masturbation, and, lastly, gastric irritation, on which last cause Osler lays considerable stress.

It will be seen by a reference to the two cases I have reported that no predisposing cause was sufficiently evident to be noticed, and the only exciting cause of those enumerated above which could possibly have had any influence is the exhaustive nervous drain of adolescence and masturbation; the former was certainly not present in either case and in neither of the two cases could I obtain any history of systematic masturbation.

In the *Lancet* for October 12th, 1901, Whiting refers to an analysis of 205 cases collected by McDowell, of Auckland, N.Z., of which 110 were in family groups, and of these 110 no less than thirty died from suffocation due to sudden obstruction of the airway from œdema. Again, in the *Lancet* for November 7th, 1908, the same writer gives a short note of three

cases, one of which was remarkable in having a special sense of aura in the form of a metallic taste before the œdema affected the tongue or cheeks.

*Conclusions.*—From my limited experience of this interesting disease I cannot come to any definite idea as to the causes either predisposing or exciting the œdema, but one can safely say that there must be some unbalancing of the nervous and vascular systems brought about by some condition which has lowered the resistance of the individual, complicated with an hereditary tendency to vaso-motor instability; also a grave danger exists in the liability of the œdema to attack the air-way and produce death by suffocation. Symptomatic treatment appears to be all that is necessary, combined with tonics and nerve sedatives, and, of course, the removal of any exciting or predisposing causes should they be present.

## AN ANALYSIS OF FIVE HUNDRED CASES OF SYPHILIS.

BY CAPTAIN A. D. JAMESON.

*Royal Army Medical Corps.*

As the treatment of syphilis by intramuscular injection of metallic mercury now seems to be the most popular method in the Service, I have endeavoured to try and determine its efficiency, and to make a standard of comparison with other methods.

To judge any treatment of syphilis two conditions are necessary: First, treatment must be begun early and continued for a sufficient time; secondly, the case must be kept under observation for a considerable time to see if any late symptoms develop. I have made an analysis of 500 cases, all of which have been treated by intramuscular injections from the early stages, *i.e.*, within four months from the appearance of the primary sore, and have been under observation from one to four years. The small proportion of tertiary symptoms speaks for the efficacy of the treatment; and as the majority of the cases were treated in other stations in all parts of the world, and were not selected in any way, they may be looked upon as fair samples of syphilitic cases treated by intramuscular injection. The time during which the various cases were under observation is as follows: Over one year (280), over eighteen months (70), over two years (75), over thirty months (47), and over three years (36).

A few remarks on primary chancres may be of interest; 10 per cent. of all chancres are stated by Fournier to be extra-genital; Keys found 3 per cent. In this series only 6 per cent. were extra-genital, *i.e.*, one on the pubes, one on the fist, and one on the anus. As only one of these could have been infected from mucous patches in the mouth, the danger of infection from this source seems over-rated.

There was one case of urethral chancre diagnosed by means of the urethroscope.

The curious condition known as a Redux chancre may here be noted. It occurs occasionally in the course of a case of syphilis, and closely resembles a primary chancre; but it is not accompanied by any secondary rash or glandular enlargement, and is believed to be an ulcerating syphilitic papule occurring on the penis. It was observed in 1·8 of the cases, the patient in each case denying having exposed himself to fresh infection.

#### EARLY SECONDARY SYMPTOMS.

These consist for the most part of various rashes, and a short description of the classification adopted is here given.

*Macular Syphilides.*—The macular, erythematous, or roseolar syphilide is the earliest and commonest rash, coming out about six weeks after the induration of the chancre. It appears first on the abdomen and flanks, and consists of small bright red spots about a quarter of an inch in diameter, which are not perceptibly infiltrated, and at first fade completely on pressure; but later, a yellow stain is left, which is due to the deposit of a brown pigment; this gives the characteristic raw-ham colour to syphilitic rashes. The mistake of confusing the normal mottling of the skin on exposure to cold with a macular syphilide must be avoided; this mottling consisting of white spots on a red ground, the reverse of the syphilide. The incidence of the macular syphilide is 61 per cent.

*Papular Syphilide.*—The papular, lenticular, or papulo-squamous syphilide (syphilitic psoriasis). This is another very common rash, appearing a little later than the macular; it has a special predilection for the flexor aspects of the limbs and the forehead, but it may be found on any part of the integument. The rash consists of bright red, raised, flat, infiltrated papules from  $\frac{1}{8}$  to  $\frac{1}{2}$  inch in diameter. The epidermis covering them is tense and shiny, and as its nutrition is interfered with by the underlying infiltration, the papule may become covered with scales and resembles a psoriasis papule. The incidence of papular syphilides is 23 per cent.

*Follicular syphilides* consist of small pointed papules situated, as the name implies, on the hair follicles. The largest papules are  $\frac{1}{8}$  inch in diameter. There is a great tendency for them to form groups, especially if the papules are small.

*Pustular rashes* are mentioned in 1·2 per cent. of the cases. Ten per cent. of the rashes noted were not specified, being described as a typical rash, profuse rash, or copper-coloured rash; most of these were probably macular.

*Mucous patches* and superficial ulceration of the buccal mucous membrane, tongue, or tonsils is noted in no less than 61·4 per cent. of the cases in all stages of the disease, owing probably to the difficulty in

preventing soldiers smoking; but one cannot help being a little doubtful if they are all really syphilitic, more especially as condylomata ani are only recorded in 11·8 per cent.

*Pains in the bones* is a common early symptom, sometimes occurring before the initial rash. When affecting the costal region it may resemble pleurisy; some cases have arthralgia. Bone pain occurred in 3 per cent. of the cases.

*Headache* is another common early symptom, and was noticed in 9·8 per cent. A small percentage of cases, however, developed after the first year, and was possibly due to cranial periostitis.

*Jaundice* is said to be an early symptom, but is only noted in 0·6 per cent.

#### THE LATE SECONDARY SYMPTOMS.

*Rashes. The Circinate Syphilide.*—The circinate, orbicular, or annular syphilide is a variety of the papular, but appears later in the disease, being a common reminder that all is not yet well. The site of election is the nape of the neck, the forehead or scrotum. The rash consists of raised red scaly ring forming an incomplete circle as a rule, but may form a gyrate figure from the coalescence of several rings. Percentage 1·4.

*Rupia.*—Percentage 1·4. All but one case developed in the first year.

*Onychia.*—Nil.

*Palmar Syphilides.*—Percentage 0·4. One of these was a secondary palmar syphilide; it appeared at the same time as a papular eruption on the body, and affected both hands. It consisted of brownish spots under the thick epidermis of the palms, which exfoliated and persisted as scaly rings long after the papules had faded. The other case was not described.

*Nodular Syphilides.*—The nodular or tubercular syphilide (syphilitic lupus) is a late secondary or early tertiary lesion. It is commonly found about the region of the nose, and may closely resemble lupus vulgaris. It is a gummatous infiltration of the integument, and forms large convex projections. When the lesion resolves, a wrinkled tissue paper-like scar is left, whether ulceration has supervened or not. If a glass slide is pressed on the lesion an infiltration like the apple-jelly nodule of lupus, but of a reddish-brown colour, is apparent. Percentage 3. Half the cases developed in the first year.

*Syphilitic Alopecia.*—There are three varieties. First, a general thinning of the hair showing itself in the third month or later. The hair falls out in patches, giving the scalp a moth-eaten appearance, though the patches themselves are not quite denuded of hair. Secondly, a rare form closely resembling alopecia areata. Thirdly, the result of ulceration of the scalp, which has been deep enough to destroy the hair

follicles. The first variety developed in 8 per cent. of the cases, never later than the eighth month.

*Iritis* is only noted in 2·4 per cent., usually in the fourth month; this is very satisfactory, as the after-effects are sometimes serious.

*Nodes, i.e., localised periostitis*, were recorded in 1·2 per cent. usually within the first year, the skull and tibiæ being about equally affected.

*Synovitis*.—One case of synovitis of the wrist was noted in the seven-teenth month.

*Ulceration*.—Ulceration of the tonsils or throat, being something more than superficial snail-track ulcers, was observed in 3 per cent.

*Laryngitis*.—Percentage 4·4; usually appeared about the eighth month and responded readily to treatment.

*Epididymitis*.—No cases.

#### TERTIARY SYMPTOMS.

*Orchitis*.—Syphilitic orchitis was found in 0·4 per cent. Two cases, one in the eighteenth and the other in the twenty-sixth month. There were no cases of any affections of the eyes, such as cncoroiditis, or of unequal pupils, paralysis of accommodation or strabismus, which are important as giving a warning of impending cranial mischief, and no lesions of the nervous system or viscera were observed.

*Gummata*.—Subcutaneous gummata gave a percentage of 1·6, usually found at the end of the second or in the third year. The scalp or legs were the commonest sites.

There were only two cases of bone necrosis, both of the nasal septum. There was one gumma of the tongue in the fifth month.

The soft palate was perforated in 1 per cent.

*Glossitis*.—Under this heading is included chronic leucoplakia and chronic interstitial glossitis. Taken together they amounted to 2·6 per cent.

*Ulceration or Stricture of the Rectum*.—*Nil*.

To sum up, out of 500 cases there were only eighteen examples of definite tertiary lesions, *i.e.,* gummata, orchitis, necrosis of bone, or perforation of the palate, and, as a rule, two or more of these occurred in the same patient. I therefore think that the results of treatment by intra-muscular injections of metallic mercury are distinctly satisfactory.

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### EXAMINATION OF ELEMENTARY SCHOOL CHILDREN.

BY LIEUTENANT-COLONEL B. L. MILLS.

*Royal, Army Medical Corps (Retired Pay).*

THE following are the figures compiled from the examination of the Sheffield elementary school children for the year 1909.

By the instructions of the Board of Education the examinations were again confined this year to fresh admissions and to those leaving school.

The total number of admissions is smaller, because as the size of all classes has been restricted, very few children below 4 years of age are now admitted.

The total number examined during the year was 5,278, composed as under :—

Ages	Senior Boys (1,295)		Parents, 382 (29.5 per cent.) attended examination	
	Kilos.	Cm.	Kilos.	Cm.
12 ..	Average Wt., 32.239 ;	Ht., 137.806 : (853)	.. Wt., 27,499.93 ;	Ht., 117,122.50
13 ..	.. 34.406 ;	.. 139.998 : (413)	.. .. 14,219.30 ;	.. 57,818.69
14 ..	.. 34.351 ;	.. 137.000 : (29)	.. .. 996.20 ;	.. 39,978.00

Bad teeth, 26 per cent. ; decayed, 69 per cent. ; perfect, 5 per cent.

Enlarged cervical glands, 787 (60 per cent.) ; tonsils, 305 (23 per cent.) ; vision, 324 (25 per cent.).

#### DEFECTS.

High palate, 175 (13.5 per cent.) ; nits, 35 (2.7 per cent.) ; head-lice, 11 ; body-lice, 16 (1.2 per cent.) ; adenoids, 16 ; anæmia, 75 ; deaf, 14 ; discharging ear, 10 ; dots, 10 ; chorea, 1 ; rickets, 7 ; mitral (R.), 3 ; aortic (S.), 1 ; eye diseases, 6 ; goitre, 1 ; abscess, 2 ; cleft palate, 1 ; tubercular glands, 12 ; ringworm, 1 ; quinsy, 1 ; hernia, inguinal, 1 ; stammers, 6 ; skin diseases, 7 ; flat foot, 1 ; spinal curvature, 2 ; 24½ inch head, 1.

Ages	Senior Girls (1,307)		Parents, 404 (30 per cent.) attended examination	
	Kilos.	Cm.	Kilos.	Cm.
12 ..	Average Wt., 36.148 ;	Ht., 139.954 : (882)	.. Wt., 31,882.70 ;	Ht., 123,446.00
13 ..	.. 33.039 ;	.. 142.933 : (400)	.. .. 14,015.9 ;	.. 57,173.05
14 ..	.. 38.044 ;	.. 140.520 : (25)	.. .. 951.10 ;	.. 3,513.00

Bad teeth,<sup>1</sup> 19 per cent. ; decayed, 73 per cent. ; perfect, 8 per cent.

Cervical glands, 59 per cent. ; nits, 75 per cent. ; tonsils, 22 per cent. ; vision, 27 per cent.

#### DEFECTS.

High palate, 144 (10.8 per cent.) ; anæmia, 62 (4.6 per cent.) ; head-lice, 35 (2.6 per cent.) ; body-lice, 16 (1.2 per cent.) ; deaf, 15 (1.1 per cent.) ; discharging ear, 6 ; adenoids, 4 ; mitral (R.), 3 ; mitral (P.), 1 ; dots<sup>2</sup> 13 (1 per cent.) ; aortic (S.), 1 ; conjunctivitis, 4 ; goitre, 4 ; split uvula, 3 ; lupus, 1 ; ringworm, 1 ; nævus (lip), 1 ; tubercular glands, 3 ; tubercular joints, 2 ; rickets, 3 ; wen, 1 ; fatty tumour (neck), 1 ; infantile paralysis, 2 ; spinal curvature, 3 ; stammers, 1 ; dilatation surface vessels, 1 ; false palate, 1 ; cleft palate (cured), 1.

<sup>1</sup> Bad teeth, *i.e.*, six or more decayed.

<sup>2</sup> "Dots" due to irritation of fleas or vermin.

Infant Boys, 1,417					Parents, 691 (48·6 per cent.) attended examination		
Ages		Kilos.	Cm.		Kilos.	Cm.	
3	..	Average Wt., 14·58	Ht., 92·57	:(142)	..	Wt., 2,070·40	Ht., 13,143·50
4	..	„ 16·046	„ 96·922	:(510)	..	„ 8,182·40	„ 49,630·50
5	..	„ 16·918	„ 105·381	:(674)	..	„ 11,402·60	„ 71,027·00
6	..	„ 17·491	„ 102·096	:(91)	..	„ 15,816·96	„ 92,907·47

Bad teeth, 18 per cent.; decayed, 55 per cent.; perfect, 26 per cent.

Cervical glands, 910 (64 per cent.); tonsils, 204 (14 per cent.); vision, 25 (1·7 per cent.); nits, 6 per cent.

#### DEFECTS.

High palate, 175 (12 per cent.); body-lice, 23 (1·4 per cent.); head-lice, 14 (1 per cent.); dots, 19 (1·4 per cent.); adenoids, 23; rickets, 59 (4 per cent.); eye diseases, 19; discharging ears, 16; ringworm, 14; anæmia, 11; mitral (R.), 3; bronchitis, 5; skin diseases, 4; stammers, 4; boils, 1; enlarged liver, 1; infantile paralysis, 1; talipes, 1; spinal curvature, 2; tubercular glands, 1; hydrocephalus, 1.

Infant Girls (1,237)					Parents, 630 (50·8 per cent.) attended examination		
Ages		Kilos.	Cm.		Kilos.	Cm.	
3	..	Average Wt., 13·086	Ht., 91·257	:(107)	..	Wt., 1,400·50	Ht., 9,734·50
4	..	„ 15·494	„ 97·979	:(390)	..	„ 6,043·60	„ 38,213·90
5	..	„ 16·820	„ 103·193	:(651)	..	„ 10,950·40	„ 67,179·00
6	..	„ 17·800	„ 101·824	:( 89)	..	„ 1,547·70	„ 9,329·60

Bad teeth, 17 per cent.; decayed, 54 per cent.; perfect, 29 per cent.

Cervical glands, 966 (76 per cent.); tonsils, 200 (16 per cent.); vision, 17 (1·4 per cent.); nits, 680 (55 per cent.).

#### DEFECTS.

High palate, 119 (9·6 per cent.); body lice, 15 (1·2 per cent.); head lice, 57 (4·6 per cent.); dots, 27 (2·1 per cent.); adenoids, 6; rickets, 31; (2·5 per cent.); eye diseases, 9; discharging ears, 6; ringworm, 13; anæmia, 9; mitral (R.), 3; mitral (P.), 1; bronchitis, 6; skin diseases, 3; stammers, 2; spinal curvature, 2; tubercular glands, 1; chicken-pox, 1; cleft palate, 1; chorea, 1; deaf mute, 1.

The two striking points brought out are the terrible condition of the teeth and the dirty condition of the girls' heads. There is no doubt that if all girls were compelled to wear their hair short during their school life the percentage of those having nits would fall to about 2 per cent. instead of 75 per cent. among the senior girls, and among the infants more than 50 per cent.

The provision of spectacles is a great difficulty. The charges made by opticians are extortionate and quite beyond the means of poor parents who are not in full work. Several cases of defective eyesight procured spectacles from hawkers in the street, paying fancy prices for often worse than useless glasses. One boy was reported to have left off his glasses

because they did not suit him, and on enquiry I found that they had belonged to a dead grandfather.

There were only two parents who were foolish enough to send written objections to their children being examined. At one school I was asked to see a particular girl first, and when she had left the room the teacher told me that the reason was that she had borrowed a pair of stockings from another girl to appear in, while the lender was shivering in another classroom without them.

One boy of 13 was recorded by his teacher as having suffered from "heart troubles," but no cause was specified.

The most extraordinary sanitary defect was discovered in a non-provided school. The drinking water supply cistern without a cover had remained for years in the ashpit of the head teacher's house adjoining the school.

### A PLEA FOR AN IMPROVED REGULATION POCKET CASE.

BY CAPTAIN H. T. WILSON.

*Royal Army Medical Corps.*

I THINK most medical officers will agree with the statement that the present regulation pocket case could easily be improved upon, and a case with more useful, better and more suitable instruments adopted.

I would call attention to a minor operating case modified for me by Messrs. Sumner and Co., Ltd., of Lord Street, Liverpool, as being most suitable and compact. It is in itself a sterilizer and contains more instruments than the regulation case, and, what is most important, a reliable hypodermic syringe; in fact, with this case alone, any minor operation can be performed, as it contains all the necessary instruments, together with the local anæsthetic "eudrenine" in tablet form.

The dimensions are 7 inches by 3 inches by 1½ inches, and the whole case will fit in the pocket, or could easily be carried in the haversack, or in a leather case with slings, and would cause no more inconvenience than the ordinary infantry officer's field glasses.

The case when empty forms a steriliser, and contains a spirit lamp, case for needles, instruments, and all-metal hypodermic syringe and stand for sterilizer.

The instruments consist of: Combined artery forceps and needle-holder, straight aseptic dressing scissors, curved aseptic dressing scissors, splinter forceps, combined spatula, frænum and tongue depressor, tenaculum, spring forceps, Spencer Well's forceps, Pean's artery forceps, double Volkman's spoon, director and aneurysm needle, two probes, six operating knives, needle case with six needles.

Besides these there is a clinical thermometer, all-metal hypodermic syringe with detachable needle, and tube of detachable needles for the

same, metal tubes containing tablets of morphia, strychnine, ergotine and local anæsthetic "eudrenine," wire and silk ligatures.

The instruments are securely fixed by bands of webbing to metal plates, which can be tightened up and fitted accurately, so that there is no rattling; the knives also are packed in a manner which prevents their being damaged by any amount of shaking; the needles, too, are packed in a spring case which holds them separately and protects their points, and shields them from rust. The hypodermic syringe is all-metal and has no washers or any parts to get out of order; it is a most serviceable and easily sterilised by boiling.



The case would be most useful to officers on detached duty, or for attending cases in quarters in a station, as the whole apparatus, both anæsthetic and sterilising, is ready for use for any small operation such as would be required to be done in quarters. If a patient who requires only dressing is being attended, the instruments which are required only need be sterilised, affixed to one of the metal plates for holding the instruments, wrapped in lint and slipped in the pocket, or if a medical

case is to be seen the metal plate holding the thermometer, hypodermic syringe and tablets need only be taken.<sup>1</sup>

The case seems to me to answer all the purposes of a regulation case, and although its size and weight are slightly more than the present one, it is immeasurably superior to it both for service and station work.

## Report.

### TRANSACTIONS OF THE BOMBAY MEDICAL CONGRESS, 1909.

By MAJOR W. S. HARRISON.

*Royal Army Medical Corps.*

(Continued from p. 659, vol. xiv.)

*Hygiene: Water Supplies.*—Cummin advocated the compulsory use in ships' water-tanks of air-pipes which open to the deck and not over the bilge, as is usual at present, with the object of preventing the absorption by the water of foul gases from the bilge.

Mathew suggested the use of acetic acid for the purification of wells suspected to be infected with cholera. He adds enough acetic acid to make the water faintly acid to litmus, but gives no experimental proofs for his method and no statistics.

Nesfield described methods for disinfecting drinking water by addition of chemicals, of which he advocated perchloride of mercury 1 in 1,000,000; permanganate of potash 1 in 70,000; iodine or chlorine 1 in 70,000, followed by neutralization with hyposulphite of soda 1 in 70,000. He gave a description also of his cylinder for the sterilization of water on a large scale by means of chlorine.

*The Haj.*—Clemow discussed the sanitary regulation of the Haj, and described the steps which were being taken to prevent the carriage of plague and cholera by pilgrims; he urged the Indian Government to establish a five days' quarantine for pilgrims in India before embarkation.

Cummin objected strongly to the infliction of further quarantine on Indian pilgrims, and described the procedure with pilgrims to prevent carriage of disease—viz., destruction of rats on ships, disinfection of clothing, &c., nine days observation on the ship. Also sanitary inspection at Perim, with quarantine if disease had occurred on the voyage.

<sup>1</sup> Since writing this description the manufacturers have sent me a rubber case which will carry one or two trays of instruments on such occasions. It is made of material that can be boiled, or treated with strong antiseptics, without affecting it. It lies conveniently inside the steriliser when not in use. The additional cost of this case I understand is only 1s. 6d.

Blackmore considered that the Mahomedans of India had a distinct grievance against the Turkish Government in the matter of their regulations for the Haj, and he thought that the Turkish authorities might be asked to take some steps to remove breeding places for cholera and plague from within their own borders. The insanitary condition of Mecca and Jeddah, &c., was notorious.

*Tropical Disease in the Navy.*—Clayton read a paper on the "Incidence of Tropical Disease in the Navy." He showed that mosquito-borne disease was very rare except among men stationed ashore, even when boats were anchored a quarter of a mile out. Filariasis was practically unknown, and in one instance where a party of 121 men were employed ashore in a place where *Culex fatigans* was abundant, and many of them infected, none of the sailors contracted disease; he suggested that prolonged residence in an infected locality was necessary to contract the disease.

*Carriage of Plague by Sea.*—Blackmore dealt with the carriage of plague by sea. He pointed out that plague had almost invariably been introduced into a country by sea, but that in no case was it traced to the introduction of a plague-infected man: the carrier was the rat. He made the somewhat surprising statement that, although Bombay was the great plague-distributing centre of the world, so far no attempt to deal with ship rats systematically had been made at that port. He strongly urged the systematic destruction of rats about the docks, so that there would be none to get on board the boats. The usual methods of preventing rats getting on a ship were ineffective.

Cummin, in the discussion, detailed the steps which were now taken in Bombay to prevent rats gaining access to ships. They consisted in keeping the ships 3 feet from the dock wall, putting rat guards on all hawsers and freshly tarring all gangways, and, in addition, the use of the Clayton apparatus was offered to all ships free of charge.

Bawa referred to the immunity of Colombo from sea-borne plague, which he attributed principally to the absence of docks and wharves at that port. In a later paper Dr. Bawa drew attention to the almost entire absence of means of isolation on board ships, and urged the adoption of regulations compelling the provision of such accommodation. He suggested that a collapsible canvas cabin capable of being erected on deck was the most suitable arrangement for ships in tropical waters.

*Sanitation of Troopships.*—Jones (United States America) described the sanitary conditions on American troopships. The air space worked out at 100 cubic feet per man, and the fans effected a change only three times in an hour, so that men on board habitually got only one-sixth of what was considered the minimum amount of fresh air needed for health. He attributed the prevalence of tonsillitis on the ships to this, and had noted that sore throats were much more frequent in rough weather, when the hatches were battened down, and especially if the troop-decks got damp from leaky deadlights. As regards water, he said bacteriological examina-

tion of water showed that by exposing it to 220° F. for a few seconds in the condensers the micro-organisms were reduced from 2,000 or more per cubic centimetre to under 100 per cubic centimetre. But they very rapidly multiplied afresh in the pipes and storage tanks; he advocated the abolition of storage tanks, and suggested arrangements for sterilization of the water as it was required from day to day.

*Sewage Disposal.*—Maxwell opened the discussion on this subject. He condemned the septic tank, and recommended a “preliminary preparation tank,” where average town sewage remained six hours, followed by distribution on percolating filters of vitrified clinker.

Gilbert J. Fowler discussed the treatment of sewage under tropical conditions. His experiments (made with a concentrated sewage) led him to recommend preliminary treatment in septic tanks (which at the commencement were inoculated from another satisfactorily working tank), followed by filtration through percolating filters of furnace clinkers, and final sterilization of the effluent by hypochlorites, or in other cases use of the effluent for flushing latrines. The gases from the septic tanks could be used for power or lighting on the works.

Dibdin described the action of his slate beds. In the discussion which followed, the general opinion was that it did not follow that methods of sewage disposal which were satisfactory in Europe were likely to be equally satisfactory in the tropics.

*Disinfection.*—Ramchandria described some experiments to test the pulicidal action of izal (1 in 100) and of heating an infected house to above 60° C. by means of braziers. Neither method was effective.

He also did some experiments on the vitality of fleas, and found that in the presence of earth and cowdung, moistened with urine, they would live for eighteen days without feeding.

*Surgery.*—Smith (Jullundur) described his treatment for trachoma, pannus, and corneal ulcer depending on trachoma. For trachoma he scrapes the lid if granulations are exuberant, then paints with nitrate of silver solution 60 grains to the ounce, neutralising with saline as soon as complete whitening of the surface occurs. In the after-treatment the eyes are not bound up, the pain is relieved by sponging with hot or cold water, and by opium  $\frac{1}{2}$  to 1 grain. The silver solution is used every second day, and cure takes six to fourteen days. For pannus he injects under the conjunctiva 15 to 20 minims of 1—4,000 solution of cyanide of mercury; this is followed by oedema and chemosis, which subsides after a week, leaving the conjunctiva fixed down to the sclera. The operation is painful, and should be done under 10 per cent. cocaine anæsthesia and followed by a dose of  $1\frac{1}{2}$  grains of opium.

If the case is a bad one, the injection should be repeated on the sixth or seventh day. He has had no accidents. For corneal ulcer he dispenses with bandages; he cuts the outer canthus to prevent pressure from spasm and to allow free exit for discharge, and avoids cocaine,

atropine and eserine if possible, considering that atropine especially aggravates the condition. He douches the eye with 1—2,000 sublimate solution from a height of 6 ft., then touches with nitrate of silver solution 60 grains to the ounce, neutralizing immediately. In some cases he gives the subconjunctival injection of cyanide of mercury solution as for pannus. He especially recommends this for phlyctenulæ, which he billows up on the injected material, scrapes the ulcer, and touches it with a stick of nitrate of silver.

*Intra-capsular Extraction of Cataract.*—McKechnie, Gidney, Jamieson, Oxley, Bhandari, Matra Das, and Lister, all pupils of Smith (Jullundar), read papers on the intra-capsular extraction of cataract, which Smith has brought so much to the fore of late years. They all speak enthusiastically in favour of the operation, which is not one, however, to be done by the inexperienced. The advantages claimed are that a cataract can be extracted at any stage of maturity; that unless the capsule bursts, as happens only in about 5 per cent. of cases, the entire lens in its capsule is extracted, that iritis is comparatively rare as compared with its frequency after "capsule laceration" operations; that there is no need for secondary discission operations; that post-operative inflammation due to retained cortex is absent; that there is no impaction in the incision of capsular tags; that convalescence is markedly shorter; that the resulting acuity of vision is much better, with a high proportion of good vision (between  $\frac{6}{6}$  and  $\frac{3}{8}$  with spherical glasses); that atropine is unnecessary in the after-treatment. The following table compares the numerical results obtained by the intra-capsular method with those by the usual capsule laceration operation:—

Operation	Total No. of cases	Vitreous escape, per cent.	Successes, per cent. (V. - $\frac{6}{6}$ - $\frac{3}{8}$ )	Partial successes, per cent. (V. - $\frac{6}{12}$ - $\frac{6}{18}$ )	Failures, per cent.
Intra-capsular .. .. .	3,896	21.31	87.12	10.49	2.51
(Smith's own cases)	<b>2,616</b>	<b>6.8</b>	<b>99.27</b>	<b>0.38</b>	<b>0.34</b>
Capsule laceration .. .. .	2,755	3.81	82.07	15.02	3.06
(Herbert's cases)	<b>1,262</b>	<b>3</b>	<b>92.1</b>	<b>6.2</b>	<b>1.7</b>

In Jamieson's paper there is a description of the operation, too detailed, however, to epitomise; essentially it consists in expressing the lens by pressure on the cornea after the corneal incision. A highly trained assistant is of the first importance, and the operation is one which should not be undertaken until the operator has had considerable personal instruction in the method.

Lister gave the after-results of escape of vitreous, which is the chief objection raised to the method. His figures showed that a small escape of vitreous was of little consequence, and it was only where a large amount was lost that any serious accident happened; the fears of remote

deterioration of vision after escape of vitreous were, in his opinion, unfounded.

McKechnie discussed the most suitable incision for cataract operation, and recommended an incision approaching a radial one, in preference to the more usual corneo-scleral flap.

The puncture and counter-puncture being at the edge of the cornea, the knife held with the plane of its blade at an angle of  $60^\circ$  makes an incision which forms an arc of a circle of *wide* diameter, the upper portion of the arc being distant from the margin of the cornea, about one-third of the length from the periphery to the centre. Gidney also described the incision for cataract extractions in great detail, and for most cases recommended a corneal incision similar to the one described by McKechnie.

*Stone in the Bladder.*—Smith read a paper on the treatment of stone in the bladder. He gave the mortality from various operations in the Punjab in 1907:—

	Cases	Mortality
Litholapaxy .. .. .	2,051	4.5 per cent.
Lateral lithotomy .. ..	185	11.8 „
Median perineal lithotomy .. ..	12	<i>Nul.</i>
Vaginal lithotomy .. ..	14	1 case.
Lithotripsy .. .. .	8	<i>Nul.</i>
Perineal lithotripsy .. ..	15	<i>Nul.</i>
Dilatation of female urethra ..	43	<i>Nul.</i>
Suprapubic lithotomy .. ..	50	20 per cent.

In his opinion dilatation of the female urethra for the removal of a stone is a barbarous operation, almost always followed by persistent incontinence of urine; he preferred litholapaxy or, if needed, vaginal lithotomy. Suprapubic lithotomy was unjustifiable under Indian conditions. Litholapaxy was the operation of choice, with perineal litholapaxy for very large or hard stones. Lateral lithotomy was only indicated where there was stricture, or where there was severe cystitis.

Stevenson advocated perineal litholapaxy for those cases where there was stricture, or where the stone was too large, or too hard for the urethral operation. He pointed out that even in boys one might get a veritable stricture from their continually rubbing the urethra against the pubic arch to relieve pain and irritation. Smith did not agree as to the causation of the tight place referred to by Stevenson, and said that it was a normal condition in boys up to 4 years of age.

Evans discussed a modification of the operation which had for its object the certainty of always entering the urethra behind the narrow membranous urethra. He illustrated his views by reference to the anatomy of the parts, the details of which are too numerous to epitomise here.

*Gastric and Duodenal Ulcers.*—Wanless gave his experience of chronic gastric and duodenal ulcer in India. He thought that they were much

more common than was generally supposed, seeing that he had performed seventy operations for the disease in two years. He attributed this frequency to the use of coarse, ill-cooked food, often with hot condiments, and to infrequent bulky meals. Of the seventy cases, sixty-four occurred in males. In many cases it was quite impossible to distinguish between gastric and duodenal ulcer before operation. Pain was the most constant symptom, coming on, not immediately after food, as is often described, but two to five hours after food, and generally temporarily relieved by a fresh meal or by drink. Vomiting occurred in fifty-eight cases, but nausea was infrequent; constipation was present in sixty-one cases. Anorexia was not common, but fear of eating was frequent; emaciation was marked, and might be extreme. Of the cases, fifteen gave a history of hæmatemesis and two of melæna. He considered operation to be indicated in all cases of ulcer which were not relieved after ten days' medical treatment with lavage, especially when food taken overnight is returned in the morning wash; also in all cases of long-standing gastric distress with occasional vomiting and progressive emaciation. The operation he used was a posterior gastro-jejunostomy; he had a mortality of seven deaths in seventy cases.

*Elephantiasis*.—Gabbet described the operation for elephantiasis of the scrotum; he preferred spinal analgesia to a general anæsthetic, and had found the method specially acceptable to Indian patients.

*Kangri Epithelioma*.—Neve discussed the epithelioma in Kashmir which is caused by constant irritation of the skin from the heat of the "Kangri" (a small charcoal brazier, which Kashmiris carry under their clothes in cold weather). Of 1,729 malignant growths, 1,189 were epitheliomatous, and of these 848 were situated on the abdomen or thighs, while 117 more were distributed on other skin surfaces—viz., leg, 46; chest, 21; face, 19; hand, 16; foot, 10; ear, 5. Along with these only 5 cases occurred on the lip, and 4 on the tongue.

Probably 963 cases out of the 1,189 were due to Kangri burns. Scars and mottling of the skin, due to the Kangri, are all very common among Kashmiris, almost universal; but the epithelioma is rarely found before the age of 40, and the average age was 55. Two types of the disease are found—the raised and the excavated. The raised form consists of patches of thickening, the surface of which usually ulcerates and gives rise to cauliflower excrescences, and the tumour may attain to 2 or 3 lb. in weight. The excavated form consists of small or large ulcers, with thick overhanging edges; these two forms are often mixed, one part of the tumour showing the raised type and another part the excavated form. Glands are slow to become infected, unless there is marked excavation, and Neve has never come across visceral metastases. Microscopically, the tumours consist of typical squamous-celled epithelioma. Treatment consists in free excision, with removal of all glands in the drainage area, if any are found to be affected. Radical cure was obtained in the majority

of cases. Statistics are difficult to get, but Neve thinks that recurrence occurs in about 20 per cent. of cases.

*Excision of the Jaw.*—Smith described his method for excision of the upper jaw; he objected to a preliminary laryngotomy and to ligature of the common carotid, as it lengthened the operation and increased the risk. As soon as the patient is well under chloroform the anæsthetist stands aside. The skin incision is made along the border of the nose, then along the lower eyelid, and out along the zygomatic arch. The soft parts are stripped off the bone, but the mouth is not yet opened. A blade of the bone forceps is driven into the spleno-maxillary fossa, the other blade lying on about the junction of the malar bone and superior maxilla in the orbit. The bone is crushed here, and by a twist of the forceps is partially dislocated; the forceps are then passed up the nose and the maxillary attachments to the nose divided. The mucous membrane of the mouth is then opened as far as required, an incisor tooth extracted, and the palate cut with the bone forceps; the soft palate is separated with one sweep of the knife; the jaw is then grasped in the region of the last molar tooth with the lion forceps and wrenched out.

Meanwhile the assistant is clamping bleeding points and controlling hæmorrhage by sponge pressure, but no arteries need tying or twisting, and hæmorrhage practically ceases as soon as the jaw is cut.

Oozing is controlled by application of steel cauteries, kept in boiling water. The whole operation up to the insertion of stitches takes five minutes, and Smith has done forty-three cases with no deaths.

The same author described an operation for removal of the Gasserian ganglion; also his method of dealing with tuberculous glands in the neck and axilla. He went on the principle that if any glands in the series were involved the whole must be cleared out, just as one does in cancer.

*Spinal Analgesia.*—Chalmers gave his experience in 31 cases of spinal analgesia, using Barker's solution. Perfect analgesia was obtained in 25 cases, partial in 5, and none at all in 1 case. Of complications, he had 3 cases of faintness, 2 of nausea, and 1 of vomiting. Among the sequelæ headache occurred 6 times, nausea once, severe vomiting once, while one patient had severe pains in the legs (requiring morphia) for twelve hours after.

## Reviews.

MANUAL OF TROPICAL MEDICINE. By Castellani and Chalmers. London : Baillière, Tindall and Cox. Price 21s. net.

If any evidence were needed as to the extraordinary activity in the study of tropical medicine which has been going on in these last few years, it would be supplied by this book. Time was, within the memory of even the younger of us, when tropical medicine was a comparatively small offshoot of general medicine ; now the subject is so vast, and advances so rapidly, that it might well take all a man's energies to keep abreast of the ever-increasing volume of knowledge. The fact that most tropical practitioners have to work in places remote from libraries and other conveniences for keeping their knowledge up to date makes it very necessary that what few books they are able to carry about with them should contain as much information as possible in the smallest compass. To such men this book should appeal very strongly. There are nearly twelve hundred pages packed as closely as it is possible to pack them with information on all subjects connected with tropical medicine ; indeed, if one were inclined to be critical one might say that the volume would have been all the better for a little judicious cutting.

The work commences with a history of tropical medicine, to which the only criticism we have to offer is that the rôle of the Army Medical School at Netley as the pioneer school of tropical medicine is completely ignored ; but that is become customary. Following on this is a chapter on climatology, somewhat dull though doubtless useful. Then comes a chapter on human physiology in the Tropics ; it is rather overloaded with descriptions of obsolete or unproved doctrines, but nevertheless it gives a very good account of the physiological adjustments which are undergone on transference from a temperate to a tropical climate. Thereafter is an outline of the geographical distribution of tropical diseases, and then comes a chapter on the physical causes of disease in the Tropics, which includes a good account of heat-stroke. We might offer the criticism here that convulsions in heat-stroke are not always of such fatal significance as the authors suggest ; we have seen several cases of heat-stroke with convulsions which recovered. We might also take exception to the recommendation of strychnine in the treatment of this condition ; nothing is so likely to intensify the convulsions. Punjab experience also teaches that the cold sponging which the authors recommend is quite inadequate to reduce the temperature in these conditions ; the authors make no mention of the use of the cold douche. The chapter on tropical intoxications ranges from poisoning by inorganic substances through vegetable to animal poisons, and includes a modern account of snake poisoning. Thereafter follows a section of 425 pages on the biological causes of tropical disease ; this part forms a veritable text-book of vegetable and animal parasitology, and includes descriptions of biting flies, fleas, rats and the like. The third part deals with diseases of the Tropics from a clinical point of view, the descriptions of symptoms and the methods of diagnosis, prevention, and treatment are as good as one

could wish. But it is surprising to find no chapter on typhoid fever ; it is true that this is not a purely tropical disease, but it holds such an important place in tropical medical practice, and it is so frequently modified in its characters by tropical conditions, that one would have thought it was at least as worthy of a place as typhus, or psittacosis, or such other cosmopolitan conditions as tattooing. The book is provided with an excellent index and is pretty fully illustrated. Unless we are much mistaken, the work will form a standard English text-book on tropical medicine for some time to come ; it is very complete, very up to date, and treats the whole subject in a thoroughly scientific fashion.

W. S. H.

**HEALTH PROGRESS AND ADMINISTRATION IN THE WEST INDIES.** By Sir Rupert Boyce, F.R.S. London : John Murray. Price 10s. 6d. net.

This is a record of a journey of inspection to Barbadoes and the West Indies in 1909, undertaken primarily to investigate an epidemic of yellow fever in Barbadoes. The book is specially adapted to the use of lay members of boards of health in tropical countries ; but it is interesting and useful also to the professional sanitarian, since it gives in detail, even to the text of the various orders published, all the steps which were taken to remedy the insanitary conditions. The author gives the history of yellow fever and other tropical diseases in the West Indies, and, in discussing the causes of the enormous improvement that has taken place, he attributes special importance to the introduction of piped-water supplies, which did away with the necessity for domestic storage of rain-water, and consequently largely reduced the breeding places for *stegomyia* and other domestic mosquitoes. The book contains numerous interesting illustrations, and, though rather of the "Blue Book" order, has much that is worth reading in it.

W. S. H.

**A PRACTICAL GUIDE TO THE ADMINISTRATION OF ANÆSTHETICS.** By R. J. Probyn-Williams, M.D., Senior Anæsthetist and Instructor in Anæsthetics at the London Hospital, Lecturer on Anæsthetics at the London Hospital Medical College. Second Edition. London : Messrs. Longmans, Green and Co., 1909. Pp. 216. 4s. net.

This book is essentially a revision of the first edition, with the addition of descriptions of apparatus and methods which have come into general use during the last few years, such as the employment of the Vernon Harcourt chloroform inhaler, and the use of ethyl chloride, and spinal analgesia.

The work will be found a very useful guide to the practical administration of anæsthetics, both general and local ; it deals with the subject in a clear manner, and, although a small volume, it includes all the important points.

A short account of the status lymphaticus, so far as it affects the condition of general anæsthesia, is given ; and there is a note on delayed chloroform poisoning. Both these conditions have of late given rise to much discussion, and their recognition is of great importance. Chapter IX. deals with local anæsthesia in a very practical manner. The book closes with a succinct account of spinal analgesia, pointing out its merits and demerits.

There are a few points on which we cannot agree with the author. On p. 4 he states that the purgative should always be given on the previous evening. It is best, we think, to give it the night but one before the operation (speaking generally), for, if given the night previous to the operation, inconvenience may arise during, or immediately after, the administration.

On the subject of diet, it is stated: "If the time chosen is not in the early morning, the last meal must be so arranged that there is at least a three hours' interval between the taking of the last food and the administration of the anæsthetic." We consider that, as a general rule, an interval of five hours should elapse between the last meal and the administration.

On p. 70 a cork prop is mentioned. This is not a desirable apparatus owing to the liability of pieces becoming detached; with possibly dangerous results. The general subject-matter of the book is so excellent that we can strongly recommend it to those studying the administration of anæsthetics, or who wish to revise their knowledge. C. B. L.

A MANUAL OF SANITARY LAW. Specially arranged for candidates for Public Health Qualifications. By Robert P. McDonnell, D.P.H., F.R.C.S.

In this book an attempt has been made to simplify and condense the Sanitary Law required for the examinations for the Diploma of Public Health. It is, however, unfortunate that the condensation has gone so far as to omit entirely very many important Public Health Acts and Regulations. In fact the omissions and, in some cases, the errors make the book quite unfitted for the purpose for which it is stated to be intended. At least six of the most recent and most important Acts are omitted, and without a knowledge of these it is doubtful whether anyone would be able to satisfy the examiners in Public Health.

C. F. W.

A HANDBOOK OF PRACTICAL PARASITOLOGY. By Braun and Lühe (English translation by Linda Forster). London: John Bale, Sons and Danielsson, Ltd. Price 10s. 6d. net.

This is a book which should receive a very warm welcome from all tropical workers, for there must be very few of them who have not been at one time or another at a loss for the want of just the information which it contains. The work is divided into three parts, dealing respectively with protozoa, helminthes, and arthropoda, each part being again subdivided into a general survey and a "special" part dealing with the details of the various classes of orders. In each case a description of the parasite is given along with its life-history so far as known, and, besides this, there are presented details as to methods of obtaining material, staining, examining, experimental methods and the like; details which, in many cases, are absolutely essential for any serious work in parasitology, and which have hitherto very often had to be sought for through sheaves and sheaves of magazines and books. A useful feature of the book for those commencing the study of parasitology is the information given as to where examples of the various orders of parasites dealt with can easily be obtained; for example, one is advised to study coccidia in the gut of

the centipede *Lithobus forficatus*, or in the kidney of common garden snails. The descriptions of the methods given are clear and easy to follow, and the authors enter into such detail that it would be difficult, one would think, to go wrong. For anyone working at tropical medicine, or for anyone wishing to take up the study of parasitology, this book is one which cannot be too highly recommended.

W. S. H.

**THE TERRITORIAL QUARTERMASTER'S GUIDE.** By Captain and Quartermaster G. H. Painton, R.A.M.C. London: W. Clowes and Son, Ltd., 1910. Pp. 68. Price 2s. 6d.

A very handy and useful guide to a difficult and troublesome subject. The alphabetical arrangement is extremely convenient for quick reference, and the blank pages for insertion of notes and amendments are most useful; but as a guide to the inexperienced it is scarcely explicit enough. Page and paragraph might have been included with great advantage in the references without adding appreciably to its bulk.

If necessary, a compensatory saving of space might be effected by the deletion of certain notes which appear unnecessary in a work of this description—*e.g.*, Notes H. Headquarters Staff, p. 31. Here a reference to K.Rs., paragraphs 142 and 143, would have met the case and saved space.

Constant reference to War Office Memos must be most discouraging to anyone not within easy reach of headquarters, where such things are available for reference.

Keeping in mind, however, the difficulties, and indeed the impossibility, of compiling a guide that will meet every case and circumstance, the book, in spite of its defects, cannot fail to be a useful guide to every Territorial Quartermaster, and Captain Painton is to be congratulated on the result of his labours.

G. G. D.

**A MANUAL OF MEDICAL EXERCISES.** By Dr. P. Lewis. London: H. K. Lewis. Pp. 66. Size crown 16mo. 1s. 6d. net.

A handy and concise manual of exercises for physical training and development.

Although there is little original matter in the volume, it may be taken as comprising in the smallest possible bulk the more important of the exercises described at greater length in other works, a detailed reference to which would have added to the value of the book. The system of numbering the various groups of exercises greatly facilitates reference.

G. G. D.

## Current Literature.

**Regulations for Employment of Nursing Sisters in the French Army.**—An Army Order has just been issued in France (No. 58 of Bureau des Personnels, Direction du Service de Santé, dated July 22nd, 1909), relative to the employment of nursing sisters in the Army. The following is a translation :—

### CHAPTER I.

#### PERSONNEL OF LAY NURSING SISTERS.

*Article 1.*—The nursing sisters may be attached to military hospitals for employment in the wards. Should their services be required in other stations the Under Secretary of State may transfer them permanently or detach them on temporary duty.

*Article 2.*—Candidates for the service must have completed their training and be in possession of a nursing certificate granted by the Board of Management of Civil Hospitals (*Assistance Publique*) or by a public or private training establishment recognized by the Under Secretary of State. Competitive examinations will be held at times and places to be notified by the Under Secretary of State. Appointments to the service will be given to successful competitors.

*Article 3.*—Candidates must be of French birth, and except in very special cases, which will be determined by the Under Secretary of State, must be between the ages of 20 and 35, on January 1st of the year in which the examination is held. Candidates, if over 25 years of age when appointed nurses on probation, have no claim to the minimum scale of pension guaranteed by Article 10 of the Decree of February 26th, 1897.

*Article 4.*—Candidates wishing to present themselves at any of the competitive examinations are to apply to the Under Secretary of State for War, enclosing a birth certificate, a true copy of the certificate of training, an extract from the civil authorities' register made within the previous three months, and a medical certificate of fitness for the service signed by a senior medical officer of a hospital.

*Article 5.*—The Under Secretary of State will draw up a list of the candidates who have been permitted to compete at any examination, and will give them all necessary information.

*Article 6.*—The examination will consist of :—

(1) A written thesis; the subject should if possible deal with elementary hospital hygiene or such treatment of emergency cases as a nurse should be capable of carrying out.

(2) Half an hour's practical test. The subject will be drawn by lot from among the list given blow.

When the examinations are finished the Under Secretary will draw up a list of successful candidates. All candidates are informed of the results of their examination.

*Article 7.*—The *personnel* consists of :—

Nurses on probation.

Nursing Sisters.

Matrons.

Nursing sisters are subdivided into three classes, matrons into two classes.

*Article 8.*—Rates of pay are as follows :—

Nurses on probation	..	..	..	800 francs (£32)
			(3rd Class, 1,042	„ (£41 14s.)
Nursing Sisters	..	..	2nd „ 1,146	„ (£45 17s.)
			1st „ 1,250	„ (£50)
			2nd „ 1,354	„ (£54 3s.)
Matrons	..	..	1st „ 1,458	„ (£58 6s.)

*Article 9.*—Lay nursing sisters will be lodged and boarded in the hospital under conditions similar to those of non-commissioned officers.

*Article 10.*—Nursing sisters who do not get quarters in hospital will receive the following annual lodging allowance :—

400 francs (£16)	in Paris.
350 „ (£14)	in towns of 200,000 or more inhabitants.
300 „ (£12)	all other towns.

*Article 11.*—Each member will receive a yearly clothing allowance of 100 francs (£4).

*Article 12.*—In hospital the following dress will be worn. By all nurses, black merino dress, white muslin cap of regulation pattern, black shoes.

On the left side of the cap, nurses on probation will wear a tricolour cockade 3 cm. in width ; nursing sisters and matrons will wear a cockade 5 cm. in width ; matrons will in addition wear in the front of their caps a five-pointed star, 2 cm. in height.

When working in the wards nurses will put on an overall cloak and a white apron ; these will be provided by the hospital ; nurses must provide themselves with black leather slippers.

*Article 13.*—All nurses will begin as probationers.

*Article 14.*—After one year's service the senior medical officer of the hospital will render a special report to the principal medical officer of the army corps on the conduct, professional capacity and general efficiency of each probationer nurse.

If this report is not satisfactory the probationer will be asked to resign.

*Article 15.*—After one year's service the probationer becomes a nursing sister, third class. Nursing sisters may be promoted from third to second class, or second to first class, by selection after three years' service or by seniority after five years' service.

Further promotion is entirely by selection and only after completing five years in the ranks. Promotion is given by the Director-General Army Medical Service, on the recommendation of the Senior Medical Officer, except in the case of matrons who are promoted by the Under Secretary of State on recommendations forwarded by the Director-General Army Medical Service.

## CHAPTER II.

## DUTIES IN HOSPITALS.

*Article 16.*—In the wards the nurses are placed under the orders of the medical officers doing duty there.

*Article 17.*—The nurses' duties are to care for the sick and wounded, especially the serious cases, to superintend along with the orderlies and ward masters the distribution of diets and the administration of medicines. The nurses will accompany the medical officers at their visits and take notes of their orders. They will be particular to see that any special orders are duly carried out, and will explain to the medical officer any notes they may have made on the patient's condition during the interval since his last visit.

They will see that the patients behave quietly, and do not obtain forbidden articles of diet; any irregularities which they have been unable to prevent will be reported to the medical officer.

As it is their duty to enforce the medical officers' orders, they will, by themselves obeying these orders, set an example to the patients.

*Article 18.*—The lay nursing sisters fulfil in military hospitals a work of unselfish devotion, and hence are entitled to every consideration and respect from the sick and their male attendants.

*Article 19.*—The tour of day or night duty is fixed at twelve and a quarter hours; during this period two hours are allowed off duty for meals.

*Article 20.*—Orderly duty may be taken voluntarily by nursing sisters, or be found in turn by all the nurses in the hospital, according to a roster. Guard or orderly duty will only be found in hospitals having at least four nursing sisters. When relieved, the nurse coming off duty will furnish a written report to the Senior Medical Officer of any occurrences of interest which may have taken place during her tour of duty.

*Article 21.*—Every lady nurse shall have one complete day off duty in each week.

*Article 22.*—Every nurse who has completed one year's service shall be entitled to twenty-five days' leave on full pay in each year. This leave is granted by the Senior Medical Officer of the hospital.

*Article 23.*—Nurses who are absent, on weekly or annual leave, or as a result of illness, and who, consequently, do not partake of any meals in the hospital, are entitled to compensation at the rate of 1 franc per meal, or 2 francs for each whole day.

*Article 24.*—Nurses who in the performance of their duty are injured, or contract a contagious disease, are entitled to full pay and allowances for six months, after which they are only entitled to draw half-pay and allowances.

*Article 25.*—Disabilities not the direct result of the service carry half-pay and allowances for three months, but only a quarter during the next three months.

*Article 26.*—In case of sickness, nurses may as a special privilege be treated gratuitously at the hospital. In this case they forfeit the right to compensation for meals while in hospital.

*Article 27.*—Lady nursing sisters who become pregnant will cease to be employed in the wards as soon as their condition is noticeable. They

will be suspended from all duty during the fifteen days preceding the confinement, and for twenty-one days following it. They will receive full pay and allowances for this period. Those nurses who during, or at the expiration of this period, are found to be physically unfit to perform their duty, will be dealt with under the provisions of Article 25.

### CHAPTER III.

#### GENERAL REGULATIONS.

*Article 28.*—In addition to the regulations enumerated above, the arrangements and regulations affecting civil employés in military establishments shall apply to the lay nursing sisters in military hospitals.

#### *Programme of Practical Tests in the Competitive Examination of Lay Sisters for employment in Military Hospitals.*

(1) Application of a dressing. (2) Recognition of common medicaments. (3) Recognition of surgical instruments in common use. (4) Recognition of apparatus commonly used in hospitals.

#### *Dressings and Medical and Surgical Nursing.*

(1) Asepsis. (2) Antiseptic methods, principles, aim and means. (3) Disinfection in general. (4) Dressings. Materials necessary for dressing a wound, compresses, strips, &c., bandages simple and compound, Fracture appliances. (5) Local applications, liniments, ointments, blisters, &c., enema apparatus. (6) Venesection, cupping. (7) Treatment of syncope. Temporary arrest of bleeding. Epistaxis, hæmoptysis, hæmatemesis. (8) Thermometers, temperatures and charts. (9) Hypodermic injections, care of the syringes, administration of. (10) Baths, general and local. Lotions, compresses, bath treatment of typhoid. (11) Precautions when dealing with contagious diseases.

#### *Pharmacy.*

The different kinds of medicaments. For external use: dangerous remedies, precautions in using them. Administration of collyria, gargles, &c. For internal use: Principal drugs used, pills, draughts, cachets, &c., serums. How to distinguish the dangerous ones and prevent accidents. Different methods of administration.

#### *Massage.*

General principles of massage.

**Scurvy in the Russian Army and Navy.**—In the *Deutsche Militärärztliche Zeitschrift* of August 20th, 1909, Oberstabsarzt Dr. Blau gives a good *résumé* of the occurrence of scurvy of recent years in Continental armies, with special reference to the Russian army in Manchuria and the garrison of Port Arthur during the siege.

The incidence in the Austro-Hungarian army was as follows:—

1901,	78 admissions	—	0·2 per 1,000 of strength.
1902,	112	„	— 0·4 „ „
1903,	64	„	— 0·2 „ „
1904,	468	„	— 1·6 „ „
(The 8th Army Corps had 10·2 admissions per 1,000.)			
1905,	78 admissions	—	0·3 per 1,000

During the first occupation of Bosnia the Austrian troops suffered severely from scurvy.

During the above years, the French, Belgian, and Dutch armies were almost entirely free from this disease.

The Italian returns group scurvy with other diseases.

In the German army, with an approximate strength of 530,000, there have never been more than five cases in any one year, from 1898 to 1907. Among the German troops employed in the Boxer Expedition, a few cases of scurvy during convalescence from typhoid were noted in the winter of 1900-01.

During the Franco-German War of 1870-01 only a few isolated cases of scurvy were reported, but in the army besieging Paris several observers noted a scorbutic tendency which had an unfavourable influence on other diseases. Among the French prisoners of war, however, a great many instances of purpura, scurvy, and allied diseases were noted. In four places small epidemics occurred. These were:—

				Strength		Admissions for scurvy
Wesel	..	..	..	18,000	..	150
Neisse	.	.	..	11,000	..	55
Wittenberg	..	..	..	4,000	..	75
Ingolstadt..	..	.	..	9,000	..	159

In Ingolstadt, the conditions of feeding, housing, and clothing of prisoners conformed to the standard prescribed by regulation.

The causes of this epidemic were thought to be (a) mental depression due to captivity; (b) crowding a large number of persons into comparatively small spaces; (c) dampness of the walls; most of the cases occurred in casemates, and at the time of year when the walls usually "sweated."

In the German navy, scurvy is of rare occurrence.

*Russian Army.*—The following table shows the incidence in the Russian army:—

				Admitted		Invalided		Died per 1,000 of strength
1903	..	..	..	0.7	..	0.2	..	0.01
1904	..	..	..	1.0	..	0.4	..	0.01
1905	..	..	..	0.8	..	0.3	..	0.005
1906	..	..	..	3.5	..	0.6	..	0.03

During 1904 the epidemic in Port Arthur during the siege, and a smaller one in Sveaburg, caused a considerable rise in the incidence. In 1905 there were no epidemics of scurvy. The great rise took place in 1906 after the war. The troops most affected were those who had spent the winter and spring in Manchuria, and were sent back to Russia during the summer of 1906. Possibly the disease had really originated in Manchuria, and been aggravated by the long journey back to Russia with its attendant difficulties in feeding, so that on arrival in Russia, where the medical officers had sufficient leisure to examine their sick, the affection was sufficiently developed to be recognised and diagnosed, instead of being confused with anæmia or malarial cachexia.

In former years scurvy must have been fairly common in the Russian army, as is shown by the following figures for the garrison of Moscow:—

				Admissions		Invalided		Died
1881	..	..	..	708	..	543	..	30
1882	..	..	..	312	..	211	..	26
1883	..	..	..	445	..	414	..	26
1884	..	..	..	146	..	129	..	10
1885	..	..	..	423	..	378	..	12
1887	..	..	..	97	..	93	..	4

Scurvy was also noted as a complication of other diseases in 603 cases during four years.

In the Russian navy the incidence was 4 per 1,000 of strength in 1905, and 0·7 in 1906 (the former year includes the *personnel* employed in Port Arthur). The cruiser squadron in Vladivostock had 101 cases, of which 66 occurred in the cruiser "Bogatyr." The incidence in Vladivostock has always been much higher than in any of the Baltic ports.

*Siege of Port Arthur.*—The following notes on the conditions in Port Arthur are taken from the report by Obermilitärarzt M. O. Isserson, in charge of No. 5 Feldlazarett.

The first cases began in July, 1904; the greatest incidence was in December, 1904, followed by a very rapid diminution in January, 1905, consequent on the surrender of the fortress and improved food supply. The total number of cases was about 900 with 50 deaths; indeed scurvy was almost as fatal as some of the more dreaded contagious diseases. The percentage of deaths to admissions for enteric was 66, for dysentery, 26; while for scurvy it was 41·7.

Isserson gives the following notes on food supplies during the siege. The issue of fresh meat ceased early in August and the troops received corned beef on four days a week. Horseflesh was available for some weeks, the sick receiving 3 to 6 ounces daily.

At the beginning of September preserved meat ran short and the troops received horseflesh twice a week, together with rye flour; the hospitals were given wheaten flour for a time, and later on ships' biscuits.

In October butter and preserved milk were no longer obtainable and the flour became mouldy and weevily. The food supplies were at their very worst towards the end of the year.

The influence of feeding on the incidence of scurvy is clearly shown by the admission-rates. Thus in June there was 1 case of scurvy, in August, 25; in September, 35; in October, 170; in November, 270; and in December, 400.

As a result of his experience Isserson states that no treatment is of any use without proper dieting. The causes of scurvy are several, and may be grouped as follows:—

- (1) Monotony of diet.
- (2) Inferior quality of the food.
- (3) The strain of active service.
- (4) The influence of the numerous fast days in the Russian army. The number of these varies in different regiments from 23 to 183 in the year.
- (5) Poor physique; many weakly men who were not in a fit condition to stand the hardships of a campaign had to be recalled to the colours from the reserve.
- (6) Bad hygienic conditions under which the troops lived in the field, in dug-out huts or Chinese "fanzen."

Dr. Blau, in commenting on the above notes, states that monotony of diet alone cannot be a very potent cause of scurvy, as Fritjof Nansen and Johannsen lived for months on fresh meat and fat without any impairment of health. He quotes Jackson and Vaughan Harley's experiments on monkeys to show that tainted food tends to produce scurvy, and thinks that under the conditions prevailing in Port Arthur during the siege this was probably one of the main factors responsible for the excessive incidence. The possibility of scurvy being a secondary infection due to oral sepsis as advocated by Horne must not be overlooked.

The Russian experiences demonstrate that the prophylaxis of scurvy in the field lies in:—

- (1) Assuring a regular and sufficiently varied food supply.
- (2) Preventing the consumption of any articles of doubtful quality.
- (3) Examining all mouths and where necessary insisting on anti-septic treatment when the general conditions of service in any way favour the appearance of scurvy.

C. E. P.

**Typhoid Media.**—L. Padlewski (*Centralbl. f. Bakt.*, Orig., Bd. xlvii., Heft 2, p. 540, 1908) says that among the German Public Health Laboratories, while one uses Drigalski-Conradi's medium for the isolation of the *Bacillus typhosus*, ten employ malachite green agar, sometimes combined with other methods. He draws attention to important defects in the action of this dye. In the first place, its chemical composition is liable to variations which extend to its inhibitory powers. Then some growths of the enteric bacillus are restrained to as great an extent as those of *B. coli*. Moreover, the identification of the typhoid colonies is not an easy matter, all the more so, as the agglutinative property of the bacillus is much impaired by malachite green.

Padlewski recommends the following modification: To a 3 per cent. agar, prepared with broth or meat extract, he adds 2 per cent. peptone and 3 per cent. ox-bile, liquefied by heat and filtered through cotton-wool, and 1 per cent. lactose dissolved in a small quantity of water. The reaction should be weakly alkaline to litmus. The agar should be nearly clear, though it is not necessary to filter it a second time after the addition of the bile. The mixture is put into flasks, 100 cc. in each, and sterilised fractionally; 100 cc. are liquefied, cooled to 60° C., and the following ingredients added: 0.5 cc. of a 1 per cent. watery solution of malachite green, chemically pure Höchst, 0.5 cc. of ox-bile, 0.75 cc. to 1 cc. of a 10 per cent. freshly prepared watery solution of sodium sulphite. It is poured into dishes which are left uncovered in the incubator for a quarter of an hour. The agar is of a pale yellow colour, without a tinge of green, since the dye has been decolorised by the sodium sulphite. The salt alone precipitates malachite green. The addition of bile prevents this. Typhoid colonies remain colourless; coli are deeply tinted green—hence the distinctions are well marked in twenty-four hours. The enteric colonies attain twice or three times the dimensions of those grown on the usual malachite green, and on Endo's agar. The borders are sinuous, the surface is delicately furrowed, finely granular, and is often terraced. The *B. coli* colonies are coarse, opaque greenish-brown, and are destitute of furrows. Paratyphoid growths resemble typhoid. Streptococci and staphylococci are inhibited. Padlewski isolated the

*B. typhosus* thirty times in forty-six examinations of dejecta on this medium. In fifteen comparative experiments he made with Drigalski-Conradi's, Endo's, and his method, he recovered the typhoid bacillus from excreta four times by the two former, and nine times by his own.

If the plates are prepared some days before use the agar may assume a greenish tint. This change rather facilitates than hinders the identification of the typhoid colonies, as they bleach the agar beneath them.

Megele (*Centralbl. f. Bakt.*, I Abt. Orig., Bd. li., Heft 5, December 15th, 1909) reports that in 400 examinations of excreta he detected the typhoid or paratyphoid bacillus sixteen times by means of Loeffler's malachite green, twenty-eight times by Drigalski-Conradi, and twenty-nine times by Padlewski's medium. The growth of the colonies was much more luxuriant on Padlewski's agar than on the other two. He noted that colonies of alkali and acid-producing bacteria, which often cause confusion on Drigalski-Conradi plates, can be distinguished readily on the Padlewski medium. The usual saprophytes of the intestinal contents are restrained to such a degree that a loopful of the faecal emulsion may be inoculated on the surface with a fair prospect of success.

J. Grimm (*Hyg. Rundschau*, No. 14, 1909) and Werbitzki (*Arch. f. Hyg.*, Bd. lxi., 1909) have reported favourably on Padlewski's process.

Kathe and Blasius (*Centralbl. f. Bakt.*, I Abt. Orig., Bd. lii., Heft 5, p. 586, December 15th, 1909) contribute a long article on the comparative merits of old and new typhoid media. They tried the powers of growth of the typhoid and colon bacilli weakened by a stay in physiological salt solution. The enteric micro-organism could be recovered from the fluid after twenty-four days (the period of the experiment) by means of Padlewski's, Conradi's and Endo's methods, but only up to fifteen days when inoculated on Loeffler's malachite green, and Drigalski-Conradi's agar. They observed the time of appearance and characters of the growth of the bacillus isolated from the blood. For this purpose they took 2 cc. of blood from enteric patients and mixed it with 10 cc. of ox-bile which, after incubation at 37°C for fourteen to twenty-four hours, was inoculated on the various media. Colonies appeared in greatest number, and at the earliest time, on the Padlewski, and Conradi and Endo plates. The growth was slower on the Drigalski-Conradi agar and was even more delayed on Loeffler's malachite green, which failed to detect the presence of the germ in 13 per cent. of the cases in which it was found. In fifteen typhoid dejecta from which the microbe was isolated, Padlewski's method was successful in 10; Conradi in 9; Endo's in 8; Drigalski-Conradi's in 6; and Loeffler's malachite green in 3. In sixteen samples of urine which contained the typhoid bacillus, these bacteria were recovered by Endo's agar in all, by Conradi's and Padlewski's in 15, and by Drigalski-Conradi's in 14, and by Loeffler's malachite green in 8. Their observations on malachite green show that the colon bacillus is markedly inhibited by it, but the growth of the typhoid bacillus is also restrained. Lentz and Tietz's method of inoculating Drigalski-Conradi plates with physiological salt solution which has been washed over the twenty-four hour growth on the malachite green agar, recommended by some authors, was not very successful in their hands. They consider Endo's agar a favourable medium for the isolation of the *B. typhosus* which may have been weakened in any way. It is especially adapted for

the investigation of bacilluria. Drigalski-Conradi's agar is somewhat costly and troublesome to prepare and labours under the disadvantage of permitting the growth of many micro-organisms, the colonies of which resemble those of the typhoid bacillus. Moreover, the *B. coli* thrives luxuriantly. The author's note with regard to Conradi's brilliant green pteric acid agar that though it is a useful medium, yet, neither *B. coli*, *B. proteus*, nor *B. alkaligenes* is suppressed. They think that Padlewski's combination, although not perfect, has considerable advantages over the foregoing. Both typhoid and paratyphoid grow more abundantly on this than on any of the other media. The differentiation between the colon and typhoid colonies is well marked. A combination of lactose, acid-fuchsin, and malachite green introduced by the Kindborgs is of no service.

According to Kathe and Blasius, two or three loopfuls of the dejecta should be smeared on a Conradi plate; a Padlewski plate should then be inoculated with the same wire. So likewise should two or three loopfuls be distributed on malachite green agar, followed by an application of the loop to the surface of an Endo plate.

If no suspicious colonies can be discovered after eighteen or twenty hours' incubation at 37° C., then Endo plates should be inoculated with the washings of the Conradi, and malachite green plates.

A. Müller (*Arbeiten aus dem Kaiserlichen Gesundheitsamte*, January, 1910, p. 443) has experimented with sodium taurocholate in place of bile in malachite green agar. The medium which contained 1.9 per cent. of a 0.2 per cent. watery solution of malachite green and 0.2 per cent. sodium taurocholate gave the best results with laboratory cultures of the *B. typhosus* and *B. coli*. He gives no evidence of the efficacy of this method in the isolation of the former microbe from water or excreta. C.B.

**Changes in the Equipment of the French Infantry** (*Jahresberichte über das Heer—und Kriegswesen*, xxxv. Jahrgang, 1908, p. 103).—During the year 1908 the entire 9th Infantry Division (Orleans) was used for experimental purposes, in reference to clothing, equipment, and food supply. The actual findings of the commission ordered to report on these experiments are not known, but it appears certain that no changes in the present colour of the clothing worn will be instituted. The dark blue overcoat and the red trousers are to be retained as a service issue (it is understood that the latter are considered useful as an indication for the artillery, so that they may not fire into their own infantry comrades.) The greatcoat is, however, to be made of lighter material than the present coat, with a falling collar and cape, and bronzed buttons. In place of epaulettes, blue shoulder-straps with a small roll of cloth at the outer end are to be worn. This latter addition is intended to prevent the rifle or rifle-sling, as the case may be, slipping off the shoulder on the march (the Austrians have a similar contrivance, but on the right shoulder only). In barracks, but only exceptionally on the march, the soldier is to wear a single-button blouse (*vareuse*, *litewka*), which on manœuvres will be provided with a stand and fall collar. No change is intended as regards head and foot gear. The latter consists of lace boots, and leather gaiters, with light camp shoes. All leather straps are to be of the natural colour (the present straps are black). The knapsack is to be brown, and soft, like a rucksack. It lies when carried somewhat low on the back,

and has two straps through which the arms are passed. On the rucksack is carried the mess-tin. The haversack and water-bottle no longer hang on straps which cross the chest, and interfere with the breathing, but are so arranged that the weight bears directly on the shoulders. All metal parts are of aluminium. The weight of the side arm and entrenching tool bears partly on the belt, and partly on the greatcoat, by means of special straps. The soldier also carries on his belt three flat cartridge pouches, two in front and one behind, holding in all eighty-eight cartridges (the number carried in the present equipment is one hundred and twenty in three pouches similarly arranged). The remainder of the ammunition is to be carried in the company ammunition-cart. In the rucksack only one shirt, one soft cap, one set of eating utensils, an iron ration, six biscuits, and the camp shoes are to be carried. In addition, one ration bag will be carried for every eight men, and a water-bucket (*wassereimer*) for every half-section. The whole knapsack only weighs about  $6\frac{1}{2}$  lb. All necessaries except the above-mentioned articles, including the blouse, will be made up into a bundle (*ballot individuel*), and carried in the company baggage-cart in the first line transport.

The entire load carried by the infantry private will in future be 20 kilogrammes, as compared with 26.7 kilogrammes carried by the German soldier. The following table gives the comparative weights of the present and the proposed knapsack and contents.

		Present		Proposed
Knapsack	..	1,700 grammes	..	600 grammes
Shirt	.. ..	450 "	..	335 "
Cap	.. ..	45 "	..	100 "
Shoes	.. ..	1,025 "	..	600 "
Iron ration	..	2,254 "	..	960 "
Mess-tin	.. ..	400 "	..	400 "
Total	..	5,874 grammes	..	2,995 grammes

In addition, in the present equipment, other articles are carried in the knapsack, bringing the total weight up to 7,804 grammes, so that the total saving in this direction is 4,804 grammes, say 10½ lbs.

(The above weights of the "present" equipment have been taken from Lavissee's "*Sac au Dos*," which differ somewhat from those given by v. Lobell. The weight of a mess-tin in the museum of the College is rather over 400 grammes, and since this is made of block tin the new "tin" if of aluminium should be considerably lighter. The German mess-tin, which has a capacity almost twice that of the French *gamelle individuelle*, but is made of aluminium, weighs only 384 grammes. There is obviously room for an additional considerable saving here.)

The new greatcoat weighs only 1,500 grammes as compared with 2,160 grammes in the case of the present pattern, whilst the weight of the water-bottle when filled is reduced from 1,425 grammes to 1,180. But according to Lavissee the weight of the old "*petit bidon*" with its straps and cup was only 500 grammes, and that is also approximately the weight of two sets in the College Museum. The weight of these, keeping the present shape and size, but substituting aluminium for tin, could be reduced by about one-third. It is evident that apart from

this the alterations in the weight of the knapsack, and its contents, and the lightening of the greatcoat signify a total reduction of weight of about 12 lb., a very sensible improvement. The present equipment, including arms, ammunition, entrenching tool and shelter tent, weighs, according to Lavisie, from 25·317 to 28·426 kilogrammes, that is from 55½ to 62½ lb. The proposed equipment as already stated will only weigh 20 kilogrammes, say 44 lb. In view of the work of Zuntz which seems to show that any weight in excess of one-third of the body weight (that is, 45 lb. for a 10-stone man) seriously penalises, in the racing sense, the carrier, these reductions can only deserve the strongest approval, from the physiological point of view. Whether the reduction of ammunition will meet with equal approval from tacticians, or the reduction of comforts prove to the satisfaction of sanitarians, is another matter which merits serious consideration. There have been alterations also in the composition and packing of the iron ration. Instead of carrying two days' ration, one only is now carried by the man, the other being placed in the transport. The sugar and coffee are increased at the expense of the rice and dry vegetable issue (the old ration contained 30 grammes rice and the same amount of dried vegetables, with 21 grammes of sugar and 16 of coffee). Each man now carries a small tin of preserved meat; previously one in four carried a large tin weighing 1 kilogramme (2·2 lb.), and the daily allowance has been raised from 250 to 300 grammes.

C. H. M.

**The Sterilisation of Novocain and Suprarenalin Solutions** (*Deutsche Militär. Zeitsch.*, April 5th, 1910).—Solutions of suprarenalin and novocain, or tropacocain, if sterilized by boiling even in tubes of best Jena glass, turn pink in colour, which indicates that the suprarenalin has undergone some alteration and has lost its physiological properties. This decomposition is attributed to the action of the alkali contained in the glass. Experiments have shown that the addition of two drops of dilute hydrochloric acid (P.G.) to each litre of normal saline solution in which the suprarenalin is dissolved, prevents this decomposition. Tests are now being conducted in order to determine whether this quantity of acid is sufficient to neutralize any further alkali which might be taken up from the glass during prolonged storage.

Other experiments are being conducted to determine how tropacocain and suprarenalin can best be stored in the form of powder. The two substances are mixed in an "Achat" mortar; this mortar consists of pure silicates and does not contain any alkali. Single doses of the mixed powders are then placed in glass capsules. These are exhausted by the air-pump and then filled with  $\text{CO}_2$ , in order to remove all traces of free oxygen. The tubes are sealed up and sterilized at  $105^\circ \text{C}$ ; this temperature in the absence of free oxygen does not cause any deterioration of the contents. Observations are now being carried out as to length of time during which the contents will retain their specific properties.

C. E. P.

**Note on the Intestinal Bacteriological Flora of Normal Individuals in the Tropics.**—Castellani (*Centralbl. f. Bakt.*, Orig., March 19th, 1910, p. 123) has investigated 11½ colonies taken at random, which had

been grown aerobically on agar plates inoculated with the fæces of eleven healthy people in Ceylon. In the table it is seen that the *Bacillus neapolitanus* of Emmerich occurs with the greatest frequency.

Intestinal bacteria isolated	Number identified out of 114 colonies investigated	Maltose	Glucose	Lactose	Mannite	Dulcite	Saccharose	Litmus milk	Glucose agar	Liquefaction of gelatine	Liquefaction of serum	Motility	Indol	Gram	Voges-Proskauer reaction
<i>B. ac. lact.</i> (Hüppe) ..	9	AG	AG	AG	AG	0	0	AC	G	0	0	0	+	0	0
<i>B. grimalii</i> (Cast.) ..	6	"	"	"	"	0	0	"	"	0	0	+	+	0	0
<i>B. lact. aerog.</i> (Escherich) 4	"	"	"	"	"	0	AG	"	"	0	0	0	±	0	+
<i>B. coli com.</i> (Escherich) ..	6	"	"	"	"	AG	0	"	"	0	0	+	+	0	0
<i>B. coli immobilis</i> (Durham) 7	"	"	"	"	"	"	0	"	"	0	0	0	±	0	0
<i>B. neapolitanus</i> ..	36	"	"	"	"	"	AG	"	"	0	0	0	±	0	0
(Emmerich)															
<i>B. pseudo-coli</i> (Cast.) ..	22	"	"	"	"	"	"	"	"	0	0	+	+	0	0
<i>B. cloacæ</i> (Jordan) ..	4	"	"	"	"	0	"	"	"	+	±	+	±	0	+
<i>B. entericus</i> (Cast.) ..	3	"	"	"	"	AG	0	0	"	0	0	0	0	0	0
<i>B. paraentericus</i> (Cast.) ..	7	"	"	"	"	"	AG	A	"	0	0	+	+	0	0
<i>B. enteritidis</i> (Gartner) ..	1	"	"	0	"	"	0	0	"	0	0	+	+	0	0
<i>B. undetermined</i> ..	1	"	"	AG	"	0	A	A	"	0	0	+	+	0	0
<i>B.</i> ..	1	"	"	0	0	0	A	A	"	0	0	0	+	0	0
<i>B.</i> ..	1	AG	"	AG	AG	AG	AG	AC	G	+	+	0	0	0	0
<i>B.</i> ..	3	"	"	"	"	"	"	"	"	+	+	+	+	0	0
<i>B.</i> ..	2	"	"	"	"	"	"	"	"	+	+	+	0	0	0
<i>Streptococcus</i> ..	1	A	A	A	0	0	A	AC	0	0	0	+	+	+	0

A = acid.

G = gas.

C = clot.

C. B.

**Voluntary Aid Societies, Germany—Provision of Medical Stores in Peace.**—Schedule of Articles which the voluntary aid societies are recommended to collect and store in peace time, for use in the dressing, refreshment, and evacuating stations which these societies will be required to open in war time, as also for the equipment of auxiliary hospital trains and ships. (*Nachweis der Sanitätshilfsmittel*, &c., S.H. fr. K. Official, 29 pp., Berlin, 1909. Not on sale.)

This pamphlet has been drawn up by the medical department of the Prussian War Office in conjunction with the Central Committee of the Prussian Red Cross Society.

*Introduction.*—During the campaign of 1870-71 it was frequently found that the articles of clothing, equipment, and medical comforts supplied by the voluntary aid societies for the use of the sick were not always of a suitable nature, and were consequently of little or no use. Her late Imperial Majesty the Empress Augusta assembled a conference in 1876, which, after careful deliberation, drew up a schedule of suitable articles. The purposes of this schedule was, in the first place, to prevent voluntary aid societies wasting their money on useless and undesirable gifts; and secondly, to afford information as to the articles which were most likely to be required for the use of the sick and wounded. This schedule was revised in 1886.

The present edition is drawn up not only for the purpose of showing the articles which are most likely to be required, but to show the quantity of such articles likely to be required for a given number of sick. For the assistance of the field army the military authorities do not expect voluntary aid societies to furnish any articles other than those named in this schedule. If other articles should be required to amplify the equipment of general hospitals in the home territory, the Army Headquarters General Staff will communicate with the territorial delegate of the Red Cross Society, in accordance with instructions contained in *Vereinslazarett Anhalt*.

In order to have the articles supplied by the voluntary aid societies of a standard pattern the schedule contains an appendix giving the contents of a "pattern chest." These chests contain one standard pattern of each of the articles in the list; the central committee will send one of these pattern chests to each provincial committee, and members of voluntary aid societies are requested to copy these patterns exactly.

In this schedule these articles, of which patterns can be obtained, are marked by "M." There is in the chest, however, a certain number of other articles which are not contained in the official schedule, but which could be utilized in one of the society's hospitals; further particulars concerning these articles will be found in the *Anhalt* previously referred to. Before providing and storing large quantities of these scheduled articles, the question must be carefully thought out; in the first place, considerable expense must be incurred; and secondly, there must be constant supervision of the articles to ensure that these are maintained in a condition fit for use if suddenly required at a future date. In the case of certain articles it is only possible to maintain a supply provided there is a turnover at definite intervals. From this it will be seen that branches of the society should not be allowed to collect very large supplies, except with the approval and under the supervision of the provincial committee of the society, which in turn will keep itself in communication with the central committee, who will take steps to ensure that a proper proportion of all articles in the schedule is kept in store, and that no one article is provided in excess of the requirements.

Instructions for storing and caring for the materials are contained in the "Army Medical Manual" dealing with the subject. This pamphlet cancels all previous pamphlets and circulars.

*Explanatory Remarks.*—(1) The size of the various medical units which the society will have to equip will naturally vary according to circumstances. The numbers given in the schedule are merely as a guide to the proportionate quantities of each article required for that number of sick.

(2) Articles marked with a + are not to be stored, but only provided when actually required.

(3) The quantities of the other articles to be provided in peace time by individual societies will vary according to their special circumstances, as detailed in instructions for delegates of voluntary aid societies.

(4) Wounded arriving at the collecting station at railhead will already have been attended to, for this reason provision is only made here for the accommodation of fifty sick; this must be capable of expansion, as required.

(5) This pamphlet does not deal with other matters such as transport, or clothing of society's *personnel*, &c.

EXTRACT TO SHOW THE FORM OF THE SCHEDULE.

Serial number	Reference Army Medical Regulations	Name of Article	Dressing and refreshment post	Sick collecting post, rail-head	Improvised hospital train for 320 lying down	Improvised hospital ship for 30 lying down
			For the daily passage of 200 sick			
			Medical and surgical supplies sufficient for 50 wounded	Night accommodation for 50 sick		
1	XII. A. 1.	A. <i>Surgical equipment, operating coat, linen</i>	I. 6	II. --	III. 6	IV. 2

The articles are divided into equipment, dressings, pharmacy articles, medicines, linen and clothing, ward equipment.

APPENDIX.

CONTENTS OF PATTERN CHEST.

*Explanatory Notes.*—(1) The articles contained in the pattern chest have been specially selected, with the idea that the ladies should be able to make them with their own hands.

(2) Patterns of woollen and rubber articles have been excluded, as it is almost impossible to preserve them for any length of time.

(3) Patterns of surgical instruments and appliances have not been included in the chest, because of the frequent changes which take place in these, and the difficulty of maintaining instruments in a serviceable condition.

(4) Patterns of household necessities are not included, as there is no advantage in having these of a standard pattern.

Against each of the articles in the pattern chest the present price is given.

C. E. P.

## Correspondence.

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### INVALIDING FROM EAR DISEASES.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

DEAR SIR,—I am very glad to see attention drawn to this subject by Lieutenant-Colonel Cottell, but I should venture to think that a far larger percentage of his cases had ear disease on enlistment.

Careless recruiting is undoubtedly responsible in this particular direction for an enormous amount of invaliding and consequent expense to the public.

It is quite possible for an occasional case to escape the notice of hard-worked recruiting officers, but if medical officers in charge of depôts were required to examine by *speculum* and record the condition of each ear on the medical history sheet as soon as the recruit arrived, the bulk of these cases could be detected and got rid of at once. The services of an aural expert should not be required in the great majority of cases.

All cases of chronic middle ear disease should be regarded as "lame ducks," and should be ruthlessly got rid of. To keep such cases in the Service, and especially to send them abroad or on service, is bound to cause additional trouble and expense.

They may be fit for the Army Reserve for home defence, but for no other purpose.

Except for acute exacerbations, I do not think it advisable to operate, and for obvious reasons.

I am, &c.,

May 10th, 1910.

F. J. W. PORTER, *Major R.A.M.C.*

### A PHARMACOPŒIA FOR MILITARY HOSPITALS.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Seeing that all civil hospitals of any size have their own pharmacopœias, might I suggest that the time has arrived when one should be compiled for use in military hospitals? At the present moment all that exists in this direction is a list (often partly obliterated by age and dirt) in each dispensary, and few officers know what they are prescribing when ordering *mist. expect.*, or any other stock mixture.

Perhaps some of our medical specialists could be formed into a small committee and between them compose an Army Medical Pharmacopœia which all officers should be ordered to adhere to when prescribing. In

addition to formulæ for men, women, and children, useful appendices might be added containing information about mercurial cream, various sera, diet scales, diet sheets, medical history sheets, invaliding documents, contents of medical companions, surgical haversacks, and panniers, and many other small matters of interest. I am sure most medical officers, and dispensers especially, would welcome such a book.

I am, &c., &c.,

*Cork District.*

F. J. WADE-BROWN,

*April 22nd, 1910.*

*Major R.A.M.C.*

Journal  
of the  
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Original Communications.

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SLEEPING SICKNESS IN UGANDA.—DURATION OF THE  
INFECTIVITY OF THE *GLOSSINA PALPALIS* AFTER  
THE REMOVAL OF THE LAKE-SHORE POPULATION.<sup>1</sup>

BY COLONEL SIR DAVID BRUCE, C.B., F.R.S.,  
CAPTAINS A. E. HAMMERTON, D.S.O., AND H. R. BATEMAN,  
*Royal Army Medical Corps,*

AND

CAPTAIN F. P. MACKIE,  
*Indian Medical Service.*

(*Sleeping Sickness Commission of the Royal Society, 1908-09.*)

DURING the last two years the policy of clearing the shores and islands of Lake Victoria of their inhabitants has been carried out by the Uganda Administration, with a view to the stamping out of sleeping sickness.

It will be remembered that the area of distribution of sleeping sickness and of the *Glossina palpalis* in Uganda is the same, and is limited to a narrow belt along the Lake-shore and islands. For the past two years no native has been allowed to live or work within two miles of the Lake-shore, except at a few cleared landing-places, and within the last few months all the islands have been emptied.

Until recently it was believed that the fly only retained its infectivity for forty-eight hours, and that it would, theoretically, be possible with safety to clear an island of its infected population one day and restock it with healthy natives a few days later. Recent work, however, has shown this to be wrong, since it has been found by experiment that the fly can retain its infectivity

<sup>1</sup> Printed by permission of the Royal Society.

up to eighty days. It is probable that after a fly has become infected it will harbour the trypanosomes for the rest of its life ; but what the duration of this is, under natural conditions, is unknown.

From an administrative point of view, therefore, it is most important to find out how long the flies on the Lake-shore remain infective after the native population has been removed. Until this is known it will not be safe to allow the Lake-shore and islands to be re-inhabited.

As soon as the Sleeping Sickness Commission of the Royal Society reached Uganda experiments were begun to test this point. At first the flies were collected at Kibanga, a cleared landing-place in Buka Bay, 6 miles from the laboratory. This landing-place was used as a market, where the inhabitants of the Island of Buvuma came once a week to trade with the natives on the mainland. In November, 1908, Kibanga had become somewhat overgrown, and tsetse-flies were present in some numbers. As the Buvuma islanders were highly infected with sleeping sickness, this constituted a danger to the healthy natives of the mainland, who had come to the market from outside the sleeping sickness area. Steps were at once taken to have the landing thoroughly cleared of undergrowth, with the result that in a short time the flies disappeared. The following experiment shows the result :—

*Experiment 52.—Monkey.*

To ascertain if *Glossina palpalis* caught at Kibanga market-place are capable of giving rise to sleeping sickness in a healthy monkey :—

Date	No. OF FLIES		Trypano- somes	Malaria	Date	No. OF FLIES		Trypano- somes	Malaria
	Put on	Fed				Put on	Fed		
1908					1908				
Nov. 3..	—	—	—	+	Dec. 6..	—	—	—	+
" 6..	—	—	—	+	" 7..	—	—	—	+
" 14..	15	12	—	+	" 15..	—	—	—	+
" 16..	17	17	—	+	" 17..	1	1	..	..
" 17..	7	7	—	+	" 18..	—	—	—	+
" 18..	4	1	—	+	" 23..	—	—	—	+
" 19..	7	4	—	+	" 26..	—	—	—	+
" 20..	—	—	—	+	" 30..	—	—	—	+
" 22..	50	34	—	+	1909				
" 23..	—	—	—	+	Jan. 4..	—	—	—	+
" 24..	—	—	—	+	" 9..	—	—	—	+
" 25..	—	—	—	+	" 18..	—	—	—	+
" 27..	—	—	—	+	" 20..	—	—	—	+
" 29..	—	—	—	+	" 26..	—	—	—	+
" 30..	—	—	—	+	" 28..	—	—	—	+
Dec. 2..	10	7	—	+	Feb. 6..	—	—	—	+
" 3..	12	5	—	+	Mar. 1..	—	—	—	+
" 4..	5	3	—	+					

*Remarks.*—The result of this experiment is negative. The number of flies caught is small, and they soon disappeared as the clearing of the place proceeded.

The other experiments were all made with freshly caught flies from uninhabited places on the Lake-shore. The Lake-shore, as stated above, had been cleared of its inhabitants in December, 1907, and had, therefore, been deserted for nearly a year when these experiments began. It was anticipated that the flies would be found non-infective, as, in the absence of sleeping sickness cases, it was difficult to understand where they could obtain the necessary trypanosomes, and at this time the long period of infectivity of the fly was unknown. The following experiments give the result:—

*Experiment 214.—Monkey.*

To ascertain if *Glossina palpalis*, caught on the Lake-shore, where there are no natives, are capable of giving rise to sleeping sickness in healthy monkeys:—

Date	No. OF FLIES		Trypano- somes	Malaria	Date	No. OF FLIES		Trypano- somes	Malaria
	Put on	Fed				Put on	Fed		
1908					1909				
Nov. 23..	21	10	..	..	Jan. 4..	-	-	-	+
„ 24..	25	20	..	..	„ 9..	-	-	-	+
„ 25..	50	26	-	+	„ 15..	-	-	-	-
„ 26..	30	17	-	+	„ 25..	43	24	..	..
„ 27..	12	8	..	..	„ 26..	35	29	-	+
„ 28..	96	23	-	+	„ 28..	-	-	-	+
„ 30..	125	41	-	+	Feb. 2..	100	65	-	+
Dec. 1..	150	60	-	+	„ 3..	105	105	..	..
„ 2..	-	-	-	+	„ 4..	100	90	..	..
„ 3..	-	-	-	+	„ 5..	-	-	-	+
„ 4..	-	-	-	+	„ 6..	100	85	..	..
„ 5..	60	23	-	+	„ 8..	100	82	..	..
„ 7..	47	26	-	+	„ 9..	200	165	..	..
„ 12..	60	49	-	+	„ 10..	200	146	-	+
„ 14..	88	37	..	..	„ 15..	200	135	-	+
„ 15..	78	32	-	+	„ 16..	200	120	..	..
„ 17..	14	6	..	..	„ 17..	170	126	..	..
„ 18..	-	-	-	+	„ 18..	200	134	..	..
„ 23..	-	-	-	+	„ 19..	200	110	-	+
„ 28..	80	35	-	+	„ 20..	200	124	..	..
„ 30..	70	32	-	+	„ 22..	130	98	..	..
					„ 23..	200	140	..	..
					„ 24..	200	142	..	..
					„ 25..	200	135	..	..
					„ 26..	-	-	-	+
					Mar. 1..	-	-	+	+

*Remarks.*—2,500 flies were fed on this monkey for ninety-eight days before a positive result was obtained.

*Experiment 571.—Monkey.*

Date	No. OF FLIES		Trypano- somes	Malaria	Date	No. OF FLIES		Trypano- somes	Malaria
	Put on	Fed				Put on	Fed		
1909					1909				
Mar. 2..	200	152	..	..	Mar. 15..	200	152	..	..
„ 3..	200	156	..	..	„ 16..	100	78	..	..
„ 4..	100	78	..	..	„ 17..	100	74	..	..
„ 6..	150	110	..	..	„ 18..	100	58	—	+
„ 9..	200	120	—	—	„ 20..	200	112	..	..
„ 10..	200	110	..	..	„ 22..	—	—	+	+
„ 11..	200	124	..	..					

*Remarks.*—Result positive. Infection probably took place on March 15th. This means that 1,002 flies fed on this monkey before infection took place.

*Experiment 612.—Monkey.*

Date	No. OF FLIES		Trypano- somes	Malaria	Date	No. OF FLIES		Trypano- somes	Malaria
	Put on	Fed				Put on	Fed		
1909					1909				
Mar. 25..	340	185	..	..	Mar. 29..	100	76	..	..
„ 26..	250	124	..	..	„ 30..	200	115	—	+
„ 27..	200	115	..	.	April 6..	—	—	+	+

*Remarks.*—Results positive. Infection, probably March 30th ; 615 flies.

*Experiment 674.—Monkey.*

Date	No. OF FLIES		Trypano- somes	Malaria	Date	No. OF FLIES		Trypano- somes	Malaria
	Put on	Fed				Put on	Fed		
1909					1909				
April 8..	250	160	..	..	April 23..	270	180	..	..
„ 9..	500	240	..	..	„ 26..	200	160	—	—
„ 10..	500	220	..	..	„ 28..	400	240	..	..
„ 12..	500	245	—	+	„ 30..	400	160	..	..
„ 15..	500	340	..	..	May 1..	500	290	..	..
„ 19..	—	—	—	—	„ 3..	—	—	—	+
„ 20..	250	180	..	..	„ 7..	—	—	++	+
„ 22..	300	190	—	—					

*Remarks.*—Result positive. Infection, April 30th ; 2,315 flies.

*Experiment 758.—Monkey.*

Date	No. OF FLIES		Trypano- somes	Malaria	Date	No. OF FLIES		Trypano- somes	Malaria
	Put on	Fed				Put on	Fed		
1909 May 8..	270	210	..	..	1909 May 22..	—	—	—	+
„ 11..	250	170	..	..	„ 28..	200	130	—	+
„ 14..	200	120	..	..	June 2..	—	—	—	+
„ 17..	—	—	—	+	„ 7..	—	—	+	+

*Remarks.*—Result positive. Infection, May 28th ; 630 flies.

*Experiment 976.—Monkey.*

Date	No. OF FLIES		Trypano- somes	Malaria	Date	No. OF FLIES		Trypano- somes	Malaria
	Put on	Fed				Put on	Fed		
1909 June 9..	800	260	..	..	1909 June 18..	200	90	—	+
„ 10..	450	180	..	..	„ 20..	520	230	..	..
„ 17..	550	190	..	..	„ 21..	—	—	++	+

*Remarks.*—Result positive. Infection, June 10th ; 440 flies.

*Experiment 1,117.—Monkey.*

Date	No. OF FLIES		Trypano- somes	Malaria	Date	No. OF FLIES		Trypano- somes	Malaria
	Put on	Fed				Put on	Fed		
1909 June 24..	200	120	..	..	1909 June 30..	7	4	..	..
„ 25..	300	160	..	..	July 1..	—	—	—	+
„ 26..	150	80	..	..	„ 3..	500	130	..	..
„ 28..	380	165	..	..	„ 5..	500	220	+	+
„ 29..	500	210	..	..					

*Remarks.*—Result positive. Infection, June 28th ; 525 flies.

*Experiment 1,276.—Monkey.*

Date	No. OF FLIES		Trypano- somes	Malaria	Date	No. OF FLIES		Trypano- somes	Malaria
	Put on	Fed				Put on	Fed		
1909 July 9..	110	70	..	..	1909 July 19..	—	—	—	+
„ 12..	500	230	..	..	„ 20..	300	180	..	..
„ 15..	—	—	—	+	„ 22..	—	—	+	+

*Remarks.*—Result positive. Infection, July 12th ; 300 flies.

*Experiment 1,462.—Ox.*

Date	No. OF FLIES		Trypano- somes	Malaria	Date	No. OF FLIES		Trypano- somes	Malaria
	Put on	Fed				Put on	Fed		
1909 Aug. 16..	120	75	—	..	1909 Aug. 20..	170	80	..	..
„ 17..	410	250	..	..	„ 24..	350	120	—	..
„ 19..	320	180	—	..	„ 26..	—	—	+	..

*Remarks.*—Result positive. Infection, August 19th ; 505 flies.

*Experiment 1,465.—Ox.*

Date	No. OF FLIES		Trypano- somes	Malaria	Date	No. OF FLIES		Trypano- somes	Malaria
	Put on	Fed				Put on	Fed		
1909 Aug. 27..	150	90	..	..	1909 Sept. 7..	—	—	—	..
„ 28..	60	35	..	..	„ 9..	30	19	..	..
Sept. 4..	230	170	..	..	„ 10..	—	—	+ +	.

*Remarks.*—Result positive. Infection, September 4th ; 295 flies.

*Experiment 982.—Ox.*

Date	No. OF FLIES		Trypano- somes	Malaria	Date	No. OF FLIES		Trypano- somes	Malaria
	Put on	Fed				Put on	Fed		
1909 Sept. 11..	45	36	..	..	1909 Sept. 20..	—	—	—	..
„ 12..	65	50	..	..	„ 21..	115	85	—	..
„ 14..	110	75	..	..	„ 22..	180	145	..	..
„ 15..	125	95	..	..	„ 23..	410	380	..	..
„ 16..	420	160	—	..	„ 24..	300	240	—	..
„ 19..	55	40	..	..	„ 27..	370	230	+ +	..

*Remarks.*—Result positive. Infection, September 19th ; 456 flies.

The table on p. 139 summarises these results.

*It must therefore be concluded that the Glossina palpalis on the uninhabited shores of Victoria Nyanza can retain their infectivity for a period of at least two years after the native population has been removed. How much longer they will remain infective it is impossible to say, but it is obvious that these experiments should be continued, in order to answer this important question.*

With the facts at our disposal it is not possible to account for

this continued infectivity. It may be due to the duration of the life of these flies being more than two years—that flies which became infected before the natives left are still alive. Or, it is possible that the flies have lately fed on natives suffering from sleeping sickness, who have been passing in canoes from the islands to the mainland, or on natives who still frequent the Lake-shore in spite of the prohibition. Thirdly, it might be explained, if any of our canoe-men or fly-boys had trypanosomes in their blood. Or, lastly, it is possible that the mammals and birds along the Lake-shore have become infected, and so act as a reservoir of the disease.

Experiment	Place	Number of flies fed	Number of days before infection took place	Result	Percentage of infected flies*
52	Kibanga .. .. .	91	—	—	—
214	Uninhabited Lake-shore	2,500	98	+	0·04
571	" "	1,002	20	+	0·10
612	" "	615	12	+	0·16
674	" "	2,315	29	+	0·04
758	" "	630	30	+	0·16
976	" "	440	12	+	0·23
1,117	" "	525	11	+	0·19
1,276	" "	300	13	+	0·33
1,462	" "	505	10	+	0·19
1,465	" "	295	14	+	0·34
982	" "	456	16	+	0·22

\* This is calculated on the assumption that there is only one infected fly in each batch of flies used in an experiment.

To these speculations it may be answered that it is not at all likely that these flies have the opportunity of becoming infected from passing canoes, which, during the last two years, have been few and far between, or to natives still frequenting the Lake-shore. Our canoe-men and fly-boys have been kept under careful supervision during the whole of the time, their blood constantly examined, and once a month blood from each of them injected into a healthy monkey. There remain, then, the two theories—long duration of life of the fly, and a local reservoir. The former cannot at present be answered, and there is no experimental proof of the latter, since the injection of the blood of the Lake-shore birds and mammals into susceptible animals has always, up to the present, given negative results.

## SAND-FLY FEVER IN INDIA.

BY LIEUTENANT-COLONEL C. BIRT.

*Royal Army Medical Corps.*

NEWCOMERS to districts where the sand-fly, *Phlebotomus papatasi*, abounds, suffer from short febrile illnesses during the summer, when the fly makes its appearance. The chief symptoms are severe frontal headache, flushed face, suffused conjunctivæ, half-closed eyelids, tender eyeballs, pain on moving the head, eyes, or limbs, aching and stiffness in the back and legs, furred tongue, anorexia, sometimes vomiting; constipation, though diarrhœa is not infrequent; the temperature rises suddenly to 103° or 104° F., and falls gradually about the third day. The pulse remains slow. No parasites are found in the blood, but the leucocytes are diminished in number. Recovery always ensues. Second attacks are uncommon. In Herzegovina and Malta it has been proved by experiment that the virus which causes this fever is conveyed by the *P. papatasi*. It will be shown that epidemics of a similar febrile ailment prevail every summer in many parts of India. As the *P. papatasi* is widely distributed there, it is probable that destruction of this insect would be a sanitary measure of no little importance to the health of our Indian Army.

The significant increase in the admissions recorded under the headings "Influenza," "Simple Continued Fever," and "Pyrexia of Uncertain Origin," which has occurred in India during the last decade, makes it clear that many short febrile attacks, formerly classed in the ague group, are now regarded to be non-malarial in origin. The following table shows the number of cases among the British troops, 1900-1908:—

	1900	1901	1902	1903	1904	1905	1906	1907	1908
"Influenza "	237	539	107	215	349	1,014	804	864	432
"Simple continued fever" and "Pyrexia of uncertain origin "	1,479	1,486	846	1,300	1,684	3,415	3,917	2,553	5,077
Days of sickness	27,980	31,310	18,652	24,540	30,150	53,380	57,426	37,580	66,070

The disability which has arisen from these diseases has become so large that a critical study of the subject can be delayed no longer. Influenza is a short-range infection, conveyed in the

droplets of saliva and mucus scattered by the sufferers in the acts of speaking, coughing, &c. ; hence, its prevalence is greatest at the season of the year when people congregate most closely together in imperfectly ventilated rooms. Therefore, nearly all the numerous pandemics of influenza have arisen in the late autumn or winter months. The summer has remained conspicuously free. Now these are the monthly aggregate admissions for "influenza," 1900-1908, among the British troops serving in India :—

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total 1900-1908
189	206	289	412	970	496	295	483	296	397	380	157	4,562

The so-called "influenza" has its maximum incidence in May, and its minimum in December, January, and February. This fact alone should render us cautious in accepting the diagnosis of influenza as being correct in every instance. Our suspicions are not allayed when we refer to the remarks on the infection in the Annual Reports of the Sanitary Commissioner for India. There is no record of the discovery of the influenza bacillus in any of these thousands of cases. Since there is no difficulty in finding it in abundance in the sputum of the early stages of influenza if films are stained with carbol-thionine blue, this negative evidence is suggestive. Again, the terms "influenza" and "simple continued fever" often appear to be interchangeable. In the year 1900 the summer epidemic of seventy-seven cases was named "influenza" at Barrackpore, and "simple continued fever" at Cawnpore, where 105 attacks were returned. In the following summer there were simultaneous outbreaks of influenza and simple continued fever at the latter station. At Rangoon in 1901, the April to June epidemic of sixty-two cases was shown as "influenza." There was no "simple continued fever." For four years the summer febricula was classed under both headings. While in 1907, 208 attacks of "simple continued fever" occurred during the period April to September, the "influenza" admissions had become reduced to three. The statistics of Fort William are similar. In the hot weather of 1904 there were forty-seven cases of "influenza" and forty-seven of "simple continued fever." There was no "influenza" in the summer of 1907, but there were 183 attacks of "simple continued fever." The summer epidemic of 193 cases in Peshawar in 1901 was designated "simple continued fever." There was no "influenza." In 1905, 428 of the hot-weather short pyrexial illnesses were called "influenza,"

and 213 "simple continued fever." In 1906 the "influenza" incidence had swollen to 313 attacks, and the "simple continued fever" had fallen to twenty-one. In 1907 the summer outbreak of 262 cases consisted entirely of "influenza." "Simple continued fever" had undergone extinction. Sometimes, while "influenza" has been raging among the native troops during the heat of the year, the British have been prostrated with "simple continued fever," and *vice versa*. For example, at Quetta, from June to October, 1907, there occurred 197 attacks of "simple continued fever," and four of "influenza" among the British soldiers. Among the native troops at this station during this period there were 265 admissions for "influenza" and only forty-four for "simple continued fever." Conversely, while "influenza" was laying low 313 of the British troops at Peshawar during May to October, 1906, "simple continued fever" was thinning the ranks of the native regiments by causing 197 admissions to hospital. There was an outbreak of 82 cases of "influenza" among the British troops at Sialkot in 1908. Sixty-six of the attacks occurred during July, August, and September. The native troops, meanwhile were being incapacitated with "pyrexia of uncertain origin." The Report for the year 1905 contains remarks on the Peshawar outbreak of "influenza." There were 317 attacks among the British soldiers in May, and 108 in June. The symptoms were fever, headache, pains in the back and limbs, and prostration. Nausea, vomiting, and diarrhoea occurred in some cases. Ague was excluded by microscopical examination of the blood. This description harmonises with that of phlebotomus fever of the Mediterranean. Moreover, we have the weighty negative experimental evidence of McCarrison, who failed to induce the disease by inoculating the throats of healthy men with pharyngeal mucus derived from these "summer influenza" patients. He noted also that the outbreak ceased when the infected body of men was moved to a station at a higher altitude where the conditions were more favourable for the spread of true influenza. Doubtless, influenza has occasionally invaded India. L. Rogers states that instances of the disease occur for the most part in January, February, and March. The infection disappears in the hot weather. Inflammatory signs in the lungs and throat were nearly constant in the Calcutta epidemic of 1892. Therefore, the conclusion seems warranted that the "summer influenza" of India is phlebotomus or "sand-fly" fever.

The seasonal prevalence of "simple continued fever" and "pyrexia of uncertain origin" among the British troops 1900 to 1908 is here given.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total, 1900-1908
"Simple continued fever," "pyrexia of uncertain origin," British Army	573	462	968	1,715	2,182	2,935	2,984	2,709	2,765	2,283	1,402	786	21,776

It is seen that July is the month of maximum prevalence and December to March the period of minimum. The highest point on the ague seasonal prevalence curve is attained in October or November. On epidemiological grounds alone, therefore, it must be allowed that a large proportion of these seizures are non-malarial in origin. Also, it is repeatedly stated that the soldiers who have recently arrived in India are more prone to be attacked by "simple continued fever" than others. Nevertheless, many cases of ague are probably included in these figures, for we read in the Annual Reports that at some stations the diagnosis of ague has not been made unless the parasite has been discovered. Though painstaking and experienced observers, working under favourable conditions will find the *hæmamoeba* in wellnigh 100 per cent. of cases of untreated malaria, those less expert, or hampered by climatic difficulties, will not attain this ratio of success, even when quinine has not been administered. A diagnosis of ague subject to such limitations would exclude many instances of the infection. On the other hand, Captain S. P. James, I.M.S., says in his report of the anti-malarial operations, Mian Mir, 1901-1902 (Report to the Malarial Committee of the Royal Society, 8th series, p. 32), that Christophers found parasites in only 40 per cent. of cases which were diagnosed "ague" in October, 1901. James detected the *hæmamoeba* in but 45 per cent. of the admissions recorded "ague" in September, 1902, though no quinine had been given and repeated examinations were made. Doubtless, many non-malarial illnesses are returned under the heading of "Ague" where facilities for microscopic diagnosis do not exist.

"Simple continued fever" prevails in explosive outbreaks. Kamptee was visited by an epidemic in 1900; 220 attacks were registered, of which sixty-seven occurred in October. At Deesa, in 1901, 153 admissions were caused by it, half of which happened in September. The incidence in the Lucknow Division has risen from 810 attacks in 1905, when 667 admissions were registered during the period June to September, to 1,233 in 1908, of which 803 occurred during those months. Quetta has annual epidemics, with

the maximum in September; 379, 398, 197 are the figures for the years 1905, 1906, 1907. Immunity is afforded by a previous attack. On the arrival of a susceptible body of men at a station where the fever prevails, many will be infected during their first hot weather in it. In the following summer the incidence will be much less. Thus, the Report for the year 1903 shows that 187 cases of "simple continued fever" occurred in the British troops in Multan, September being the month of maximum prevalence. In the following year Multan was almost exempt, seventeen admissions only being recorded. The native regiments suffered severely at Abbottabad in the year 1906; 1,220 admissions were registered "simple continued fever." The epidemic began in May and reached its acme in September when 556 cases occurred. In November the number had fallen to thirty-five. Next year there were fifty-five attacks only, although the strength of the body of men was the same. At Aden, in the year 1908, 215 admissions of British troops were recorded under "pyrexia of uncertain origin"; 160 of the cases occurred in June, July, and August. Here, as elsewhere, the hot weather febricula is sometimes called "influenza." The writer's own experience of the Aden "three-day fever" enables him to state that it resembles sand-fly fever of the Mediterranean. He failed to detect malarial parasites in the blood.

Since the occupation of Chitral in 1895 there have prevailed yearly epidemics of febricula during the months April to July. The Chitralis themselves recognise that this ailment differs from ague, which is also prevalent, though later in the year. Captain R. McCarrison, I.M.S., has made a special investigation in these outbreaks at Chitral and Kila Drosh. He has published such a valuable report in the *Indian Medical Gazette*, January, 1906, that no excuse is needed for here reproducing much of it:—

"The fever is characterised by sudden onset, though occasionally vague pains, feelings of discomfort and disinclination for exertion precede the attack. There may be chilliness or a slight rigor, never the shivering and chattering of the teeth typical of the onset of the ague fit. Severe frontal headache, giddiness, pain in the eyeballs, aggravated by turning the eyes or moving the head, pains in the back limbs and knees, are complained of. The conjunctivæ are suffused and the face is flushed. The skin is usually hot and dry, though occasional perspirations may be noted. No rash is observed. The temperature rises rapidly and attains a height of 103° to 104° F. in twenty-four hours. The pulse remains slow. With a degree of fever from 103° to 104° F. the rate is 80 or

90 only. Meanwhile, the patient is racked with pains in his body, head, and limbs, which any change of position, in order to get ease, aggravates. The patient resents being disturbed in any way. His tongue is coated with a white fur except at the tip and edges. Constipation is the rule, but vomiting and diarrhoea are not infrequent. There is total loss of appetite. Tenderness on pressure of various parts of the body is common; sometimes sharp, shooting pains are experienced along the nerves. Malarial parasites are not found in blood films. Leucopenia is marked; the average count is about 5,000 leucocytes per c.mm. The polynuclear leucocytes are diminished, while the mononuclears are increased. The incubation period is four or five days; new arrivals are predisposed. The temperature declines gradually to normal limits in two or three days. Epidemics vary; in some abdominal symptoms may be more marked than in others. Abortive attacks are frequent. Convalescence is protracted for a week or fortnight by a feeling of apathy and lassitude which prevents the sufferer from following his usual pursuits."

This account of "simple continued fever" given by McCarrison corresponds closely with "Pappatacifeber," the sand-fly fever of Bosnia and Herzegovina. This ailment differs from the kindred infection which occurs in Malta and Crete by the langour attending convalescence, hence the popular name for it of "Hundskrankheit." The Chitral fever therefore bears the closest resemblance to the Austrian infection investigated by Doerr. An abstract of Doerr, Franz, and Taussig's work on "Pappatacifeber" in which is included a description of the sand-fly, *P. papatasi*, and of its habits, appears in Lieutenant-Colonel Aldridge's useful "Note on Pappataci Fever," 1909, which has been circulated throughout India. McCarrison observed that it was the locality and not the individual which was infectious. He noted that a stay of a few hours in an infected spot was sufficient to originate the fever. Though he thought that the disease was possibly conveyed by dust, he remarked that the period of the outbreak corresponded in a striking manner with the appearance of sand-flies. The malady did not occur where these were absent. He experimented unsuccessfully with these insects. He could not overcome the great difficulty of keeping them alive in captivity. It was still more unfortunate that his attempts to induce the fever by inoculating seven healthy men with the blood of patients ended in failure. It is probable that he abstracted blood after the first twenty-four hours of the pyrexia. In phlebotomus fever the blood is virulent during the first day only,

All the subjects of his experiments were natives from the plains, who are relatively immune. None of them were attacked at a later period.

McCarrison was just on the verge of the discovery achieved by R. Doerr in 1908, who proved that the fever is caused by an invisible virus conveyed by the *P. papatasi*.

L. Rogers states in his "Fevers in the Tropics" that he has recognised the frequent occurrence of cases similar to McCarrison's "Chitral" fever in the hot weather in the Punjab and United Provinces which gave a temperature curve differing from malaria. James has inserted charts of the short non-malarial fevers of Mian Mir in the paper referred to previously. They are identical with those of phlebotomus fever of the Mediterranean. Lieutenant-Colonel G. Wilson, R.A.M.C. (JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, June, 1909, p. 615), has made a careful study of the fevers of Ferozepore. He gives a table showing the seasonal prevalence of 2,064 cases of "simple continued fever," 1887-1906. It is a hot-weather—April to September—infection. July is the month of greatest incidence. The onset of the fever is seldom marked by a rigor. Headache is the chief symptom. Malarial parasites are absent. The temperature gradually falls to normal in three days or thereabouts. Lieutenant-Colonel J. J. Gerrard, R.A.M.C., recognises that the phlebotomus fever of Malta is identical in its clinical aspects with the short pyrexial illnesses which are common among the troops in the Punjab. Other officers who have had opportunities of observing these ailments in both localities agree that they are of the same nature. Therefore it is clear that before the admissions for the summer febricula are classed under "pyrexia of uncertain origin" a search for the phlebotomus should be made. The patient may bear the marks of its bites in the form of pimples, which are more irritable than those of mosquito bites. Sometimes, however, an urticarial spot arises which disappears in an hour or two, and every indication of the sting will have vanished next day. It is quite useless to accept the patient's statement that he has not been attacked by these flies. They are so minute that in an imperfectly lighted barrack-room they escape observation during the night. Search must be made for them in the daylight on the walls, behind clothes and accoutrements, doors, or shutters, in shady corners or crevices. A whiff of tobacco smoke often serves to dislodge them from their hiding-places. F. M. Howlett says that at least two species of phlebotomus are found almost all over India, and form the bulk of the pest known as "sand-flies."

Over North-east India the flies are most abundant at the end of September and beginning of October, the period when the short non-malarial fever is most prevalent at Fort William and Barrackpore. They appear in Bombay in March and April, according to A. Powell.

Since it has been shown that sudden outbreaks of a short fever, unlike ague, but similar to the phlebotomus fever of the Mediterranean, prevail every summer in various parts of India, and that the *P. papatasi* is widely distributed, it is suggested that many of the short febrile ailments, hitherto attributed to "influenza," "ague," "sun," "confinement to the house," "heat," "chill," "intemperance," "water drinking," "over-eating," "lack of food," "constipation," "diarrhoea," "excessive exertion," "want of exercise," "upsetting of the thermotaxic centre," "auto-intoxication," "climate," are caused by the invisible virus carried by the "sand-fly." It is probable that out of the 26,000 cases of "influenza," "simple continued fever," and "pyrexia of uncertain origin," which appear in the returns of the British Army in India, 1900-1908, 13,000 were instances of sand-fly fever.

## NASAL OBSTRUCTION IN ADULTS.

BY MAJOR G. A. MOORE, M.D.,  
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IN May, 1906, notes of unusual cases of nasal obstruction were published in this Journal. Since then I have had opportunities of dealing with a relatively large number of these cases, and some points in relation to the diagnosis and possible lines of treatment which can be adopted may be of interest.

Common to all cases of nasal obstruction is the symptom of "stiffness" in the nose; whether felt on one or both sides, whether temporary or permanent, accompanied by great or little discomfort, this condition is a reminder to the patient of "something wrong with his nose." In mild cases one finds but one nostril affected, and that perhaps only during or shortly after a cold. Not unlikely the patient states that he is most troubled after lying down at night, or again on rising in the morning, but that after his bath, and getting about at his work, the sensation passes off; and nasal respiration, which up to that time had been impossible, or practicable only with great effort, becomes again free. He will likely add that on waking, his tongue, palate, and pharynx all feel dry. He feels sure that his mouth has been wide open during sleep. In more obstinate cases the "stiffness" lasts in varying degrees for the whole day, and a wearying and hopeless struggle is kept up by the patient endeavouring to overcome the obstruction by constant snuffling. In the majority of cases, on examination of the nostrils by reflected light between the attacks, but little abnormal can be discovered. In very severe cases one can generally see a depression in the septum where the swollen turbinal has been for hours lying pressed against it.

"Stiffness" attacks all types of people. One meets it in strong plethoric men, weak anæmic women and girls, in growing lads, and in young children. Patients whose nostrils are congenitally small, or have, what is more probable, become narrow from disuse, suffer most from nasal obstruction. Most frequently one finds the condition of "stiffness" in those whose appearance warrants a diagnosis of their having suffered from marked adenoids, or enlarged turbinal ends, and who, as a result, have become entirely dependent on the mouth for respiration. In these cases, falling in of the nostril, atrophy of the dilator muscles, and evidences of insufficient use of the internal machinery of the nose, are invariably present.

To what, then, is this frequent and worrying symptom of "stiffness" due? No doubt exists as to the answer. The trouble lies in a loss of tone of the nasal mucosa, with resulting turgescence of

the coverings of the turbinate bones, and engorgement of their cavernous spaces. This oedematous condition in a never very wide passage gives rise to narrowing of the air channel, and obstruction results.

In over 90 per cent. of nasal obstruction cases the above condition is present. If one is too hasty in examination it is easy to get a very false impression of what is amiss. An incorrect diagnosis in nasal troubles means perhaps even more harm than in the case of many other organs. Affections of the nose, if existing for any time, tend to induce a marked state of mental depression. A wrong diagnosis means unsuitable treatment with increase of the original worrying symptoms.

On examination of these cases one can see a swollen, reddish mass lying on the outer side of the nose, but probably extending over to the septum. Is this a polypus coming down from the upper turbinates or ethmoid bones, and presenting below? Is it solid, as it appears to be; or semi-solid and collapsible? Is it a temporary or permanent enlargement?

A small piece of wool, dipped in a 2 per cent. solution of cocaine, applied under and to the inner side of the swelling, will soon decide these points. After a few minutes the swelling subsides, and the airway becomes re-established. The diagnosis, then, is one of temporary tumour of the erectile tissues of the inferior turbinate bone. Should no perceptible change take place, and the position and consistence of the tumour remain the same, the swelling is a permanent one, and due to a hypertrophic condition of the inferior turbinate bone. In this case a treatment very different to that for "temporary turgescient tumour" will be called for.

The condition outlined above will naturally be more frequently met with in those in whom, from congenital, accidental, or acquired causes, the septum itself is irregular in shape, and bent over towards, or perhaps even touching, the inferior turbinate bone.

*Treatment.*—The treatment of cases of "temporary stuffiness" is, on the whole, satisfactory. Few are met with where one cannot definitely promise that a great degree of relief and increased comfort will follow simple and sustained treatment. The condition present, one of local engorgement, may for the purposes of treatment be considered as analogous to that of hæmorrhoids or varicocele. The means of relief are local and general.

Local treatment is applied in the form of sedatives, and subsequently, astringents to the oedematous nasal mucous membrane by sprays, paints, ointments, or by the insufflation of snuffs and powders.

Many prefer to use nasal douches. As passing over a greater surface of the nasal passages these are by far the most satisfactory.

In prescribing, it must be remembered that the nasal mucosa is most intolerant of strong astringents. Consequently, in these nasal obstruction cases, where the mucosa is in a highly irritable, swollen condition, only the mildest sedative astringents are indicated.

Two tablespoonfuls of the following lotion, with an equal quantity of warm water, thrown from the palm of the hand through the nose and expelled through the mouth is an excellent way of starting a routine treatment.

Sod. bicarb. . . . .	8 gr.
Borax . . . . .	4 "
Sod. chlor. . . . .	6 "
Sacch. alb. . . . .	10 "
Water . . . . .	ad 3i.

To be used on rising, and again at bedtime.

This douching out of the entire nasal respiratory tract dissolves tenacious mucus, washes away crusts, snuts, hairs, &c., and acts as a mild astringent to the irritable mucosa. As the case goes on douches of

Hazeline . . . . .	30 m	} or {	Boroglyceride . . . . .	40 gr.
Borax . . . . .	10 gr.		Sod. chlor. . . . .	10 "
Glycerine . . . . .	10 m		Water . . . . .	ad 3i.
Water . . . . .	ad 3i.			

may be substituted and used in the same way.

The nose, now physiologically clean, will to a certain degree respond to stimulus. By far the best stimulus and tonic to the nasal lining is air. A few deep-drawn quiet inspirations with closed lips practised for a few minutes will often set the mechanism of a semi-blocked nose going on one or both sides. These deep slow breaths can be taken while walking, standing, or sitting. It must always be remembered that except for eating or speaking one's mouth need never be open.

Systematic stimulation of the weakened nostril-dilating muscles by the electrical current, by frequent cold douching, and by massage, helps to enlarge the lumen of the nostril, and allows a larger air current to impinge on and act as a stimulus to the turgescient turbinal.

Sudden changes of temperature such as experienced when going from a cold passage to a hot, stuffy room, are quite sufficient to start an attack. One should avoid such marked changes of temperature, and keep away from stuffy smoking rooms.

Position plays an important part. Many patients complain that they are worse even when they sit down, or when they are

lying in bed. Such patients should sleep with the head and shoulders well raised by pillows.

Change of air and locality is of the greatest use in these cases. Two days' change from an office to the seaside, from the city desk to the golf links, works wonders.

General treatment is directed toward increasing the muscular and vasomotor tone of the body. Few, indeed, are the cases where one cannot discover that by ignorance of some simple hygienic conditions the patient has set up, or kept up, the disturbing symptoms.

Unsuitable or over-abundant food, such as the dietary of a labourer being consumed by a clerk, insufficient exercise, occupation of over-heated and ill-ventilated rooms, over-indulgence in spirits or tobacco, insufficient or excessive clothing, neglect of personal cleanliness, one and all are potent factors in provoking these attacks. Lighter dietary, judicious exercise, open windows, morning baths, abstemious habits, invariably bring about a rapid improvement.

Speaking generally, tonics are indicated. Mixtures of *ferri et ammon.* or *quin. cit.*, or soda, rhubarb, and *nux vomica*, are especially useful.

In many instances the condition seems to take the form of an obstinate neurosis. A course of bromides is invaluable in these cases in combination with the above general tonic treatment. Treatment as outlined above gives relief in a great many cases; should it fail, one must fall back on the use of the cauterium, but this should be avoided if possible.

Other cases of "stiffness" are met with accompanying nasal conditions such as polypi, cysts, tumours, malignant or benign, antral or sinus disease, gummata. It would be also met with in cases of obstruction from impacted foreign bodies.

Measures for the relief of these affections will demand the greatest care and skill, but with their removal the "stiffness" will disappear.

Permanent nasal narrowing, with consequent obstruction, is usually due either to hypertrophy of the middle and inferior turbinates, especially at their anterior and posterior ends, or to irregularities of the nasal septum.

Chronically hypertrophied turbinates often obstruct the nasal airway; covered with a valuable epithelium, unless very greatly enlarged one should remove as little of them as possible.

The varieties of deformities of the septum usually described are spurs and deviations.

Spurs are, perhaps, the commonest cause of permanent narrowing of the nasal passages. They are usually cartilaginous and are situated on the anterior two-thirds of the septum.

Spurs vary in size and shape; as ridges they run parallel to the floor of the nose, and, if large, give rise to symptoms of obstruction, headaches, painful sneezing attacks, ear troubles, &c.; often they set up, or, if it is already present, keep up, the condition of rhinitis. In other cases spurs jutting out at varying angles from the septum greatly impede the entering air current.

In a very large proportion of healthy people the septum is found to be bent over to one side. It is only in cases where this is marked, either by causing actual deformity of the outline of the nose, or wearying obstruction symptoms, that the patient's attention is drawn to his condition.

The deviation may affect cartilage or bone. Cartilaginous deviations are usually the result of accident or injury (boxing); those of bone arise during development. One may usually expect to find a deviated septum in children who have the high V-shaped palate associated with adenoids.

Deviations are, as a rule, to the left, and present every variety of shape and degree of curvature; often a large curve in front will be found compensated for by another further back.

With the exception of the rigid piece of the vomer separating the choanæ, any portion of the septum may be involved in a deviation.

The anterior end of the triangular cartilage, as a result of accident or injury, is often much bent, and protrudes into the lumen of one nostril. I have seen patients deprived of as much as four-fifths of the natural nasal airway on one side from this cause.

The columnar and lateral cartilages are not uncommonly dislocated and interfere with free nasal respiration.

In all intra-nasal operations one's chief aim must be the destruction of the least possible amount of the valuable nasal mucosa, on the vitality of which the whole mechanism of perfect nasal respiration depends. It is on this conservative basis that all recent and successful intra-nasal operations have been planned.

Except where lengthy operations are inevitable, or where the temperament of the patient renders it imperative, general anæsthesia in intra-nasal operations is seldom required. Where short, painful steps are necessary, gas or ethyl chloride anæsthesia is sufficient.

Local anæsthesia is best produced by application of 5 to 15 per cent. cocaine with or without adrenalin 1 in 1,000. Cocaine may

be applied by spray, on pledgets of wool or lint, painted on with a brush, or injected subcutaneously near the site of the intended incision.

When by their bulk chronically enlarged turbinals are causing obstruction symptoms, the airway must be re-established. This is best done by dividing the obstructing portion with strong nasal scissors, and completing its removal with a cold snare or punch forceps. Some surgeons claim that the turbinals may be removed submucously. Too free removal of the turbinals involves the risk of setting up the troublesome condition of "dry nose" from loss of the moistening effect of so much turbinal tissue. Irregularities or dislocations of the anterior cartilage are dealt with by pressing up and back the tip of the nose, and incising over the prominent presenting cartilage. Under cocaine and adrenalin the mucous membrane and perichondrium are carefully dissected back with a sharp knife and elevator. The required amount of cartilage is cut off with knife or scissors. A suture is inserted uniting the incised mucous membrane. Healing takes place in a few days without further dressing. Extraordinary relief follows this small operation. Dislocations of the alar or columnar cartilages are treated by similar methods.

Cartilaginous spurs are best removed with a short, sharp knife, or spokeshave, under cocaine and adrenalin. Bony spurs require removal by a rigid saw; if situated in the front of the nose their covering of mucous membrane should be reflected, the bone sawn off, and the coverings again united by suture. If this can be done, formation of crusts over the operation site will be avoided. Hundreds of people go through life heavily handicapped by a semi-obstructed nose from the presence of a spur, &c., who could have their trouble permanently removed and their nostril rendered fully patent under cocaine anæsthesia in ten minutes.

The amount of relief experienced as a result of these small operations is very striking. If by removing ever so small a piece of the obstructing cartilage or spur even a narrow chink of airway is established, the outer muscular wall, which from disuse has been lying flaccid against the septum, will, under the stimulus of nasal respiration, rapidly regain its power. Some weeks after operation in these cases one sees the nostril on the previously useless side well dilated and in full working order.

For a description of the technique and details of the many operations for the correction of nasal septum deviation one must refer to text-books on nose work.

The older operations of Moure and Asch, Gleason and Walsham

are the best known. All these depend for their success on establishing a fracture of the deviated septum, with after-wrenching of the bulging portion over to the patent nostril. Later, tubes or splints are required to keep the septum in its new position. These operations are quickly performed, but are painful and are not always followed by permanent good results. The operation most practised now for the relief of obstruction from marked septal deviation or deformity is that of Killian. It consists of the free removal, submucously, of the distorted cartilage or bone.

Commencing usually on the narrowed nostril (to which cocaine 10 per cent. and adrenalin 1 in 1,000 have been applied), an incision is made in front of the deviation through the mucous membrane; this and the perichondrium over the convexity are then raised by an elevator. With a guarding finger in the patent nostril the cartilage is cut through from the obstructed side, when the mucous membrane on the concave side is raised from it. The necessary amount of the distorted cartilage is thus exposed, and is removed by a swivel knife. Should the bony septum require removal, the mucosa being further stripped off, the presenting bone is wrenched or clipped off with forceps (Lake's). Spurs and jagged edges along the vomerine crest are best chipped off with osteotome and mallet. Finally, the edges of the incised mucous membrane being sutured, the nostrils are packed for twenty-four hours with plain gauze smeared with sterile vaseline. By this support the risk of hæmorrhage into the weakened septum is greatly lessened.

After-treatment consists chiefly in the prevention of crust formation. Installation of 5 drops of hyd. perox. (10 vols.) every four hours for the second and third days tends to prevent this. Later, sprays or paints of menthol, 1 gr. in 1 ounce of paraffin, help the healing process.

The results of this operation are excellent. It has been performed in London this year at least 700 times, and in careful hands the risks are very slight. A very similar proceeding is that described as the Krieg-Bonninghaus's operation. The chief difference from the Killian is that no attempt is made to retain the mucous membrane on the convex side. The operation is rather shorter and easier, but the healing process is longer and the tendency to crust formation greater.

After a successful operation of this nature the relief to one who has for years suffered from the weariness of "nasal stuffiness," and the numerous disadvantages of an almost functionless nostril, is impossible to describe.

# LIVER ABSCESS AS AN IMPORTANT AND EASILY PREVENTABLE CAUSE OF DEATH IN THE BRITISH ARMY.

BY MAJOR LEONARD ROGERS.

*Indian Medical Service.*

ARMY Medical Officers have a great advantage over their civilian colleagues in that their patients almost always come under their observation at a very early stage of their illness. This advantage is most marked in the case of those diseases which by early recognition and appropriate treatment may be prevented from developing serious complications. At the present time tropical, or amœbic, abscess of the liver causes more deaths in the British Army in India than any other disease except typhoid, as has been pointed out to me by Lieutenant-Colonel Aldridge, R.A.M.C., to whom I am greatly indebted for the Army statistics given in Table I. Yet if the methods of treatment I have several times recommended are equally effective in other places as they have been in Calcutta, tropical liver abscess could, and should, be practically if not completely abolished in the British Army, where the patients come under skilled medical treatment in the easily curable pre-suppurative stage. As most of my previous papers on the subject have been published in journals which are not likely to come under the notice of the Royal Army Medical Corps officers serving in remote tropical stations, I venture to write the following lines in the hope that my methods may be given a full trial in the station hospitals of India and other tropical countries, as the results thus obtained would settle once for all their exact value.

Lieutenant-Colonel Aldridge's figures show that in the four years 1904-1907 the average number of cases of liver abscess in the British troops was 171, or 2·425 per million, and the deaths 89, or 1·26 per million annually, against 3·18 per million of deaths from typhoid in the same period. During the last five years more than 11 per cent. of the total deaths from all causes were due to this disease. Among native troops, on the other hand, the admissions for the same years averaged 0·13 per million and the deaths 0·05. In 1908 the total deaths in the British Army fell to fifty-five, while in 1909 up to the end of October they numbered only twenty-eight against thirty-nine in the same period of 1908, so that if the rate be the same during the last three months of 1909 the total deaths will number only thirty-seven, or less than half the average of the four years 1904-1907.

TABLE I.—STATISTICS OF BRITISH TROOPS IN INDIA.

		Deaths per 1,000 from enteric	Deaths per 1,000 from dysentery	Admissions per 1,000 from liver abscess	Deaths per 1,000 from liver abscess	Actual cases of liver abscess	Actual deaths from liver abscess
1894-1908	..	5.77	0.96	2.39	1.39	157.5	92.5
1904	..	3.76	0.41	2.6	1.36	184	96
1905	..	3.00	0.46	2.1	1.17	152	83
1906	..	3.19	0.53	2.6	1.52	183	107
1907	..	2.77	0.33	2.4	1.01	165	70
1908	..	2.74	0.42	1.7	0.80	115	55
To Oct. 1909	..	—	—	—	—	—	28*

\* Equivalent to 37 deaths in the year.

As the figures in Table I. show a very steady rate with no signs of decline during the fourteen years up to the end of 1907, the very great fall in the last two years—that is, the period immediately following the publication of the methods to be dealt with below in the *Practitioner* of June, 1907, and in my work on “Fevers in the Tropics” very early in 1908—I venture to hope that this marked decline is at least, in part, due to the adoption of the treatment then advocated, and therefore only a promise of a still further reduction in the near future until the vanishing point is practically reached. This hope is borne out by three notes in the medical transactions of station hospitals in 1908, referring to the success of these methods. The bare possibility of such a desirable consummation being attained is my excuse for the following recapitulation of my work on this very important subject:—

*The Etiology of Tropical Liver Abscess.*—It will suffice here to recall the following observations on this point. If the wall of such an abscess be examined either *post mortem* or by means of a light scraping made at the time of opening, living amœbæ can be demonstrated in practically every case, unless encystment of the pus is taking place. If some of the pus be taken in a sterile test-tube through a sterile trocar, it will be found to be free from cocci or bacteria in about 80 per cent. of cases. The amœba is thus the sole constant organism met with, and presumably is the cause of the suppuration, for it may also be alone met with in the very earliest stage of minute multiple abscesses, as I have several times found.

*Dysentery* has long been known to be associated with the disease, although there has been much difference of opinion as to its exact relationship, especially before the bacillary and amœbic varieties of dysentery were recognised. In a long experience in Calcutta I have only found the amœbic form of howel disease to be connected with the large tropical liver abscess containing amœbæ, and although

portal pyæmic septic abscesses may occur in other forms of bowel ulceration, they are really clinically recognisable. Suppuration in the bile-ducts within the liver constitutes another but, fortunately, very rare variety, being nearly always secondary to gall-stones, but with these I am not dealing in this paper. In a large series of Calcutta cases of fatal liver abscesses in which both a clinical history and *post-mortem* records were available, there was evidence of the occurrence of dysentery in just over 90 per cent. Of these, in 12·5 per cent. there was a history of preceding dysentery, but no lesions were found *post mortem*, while in no less than 20 per cent. there was no history or clinical signs in hospital of dysentery, yet ulceration of the large bowel was found *post mortem*. In the few remaining cases there may also have been a similar latent dysentery which healed before the patient died of liver abscess. I therefore hold that ulceration of the bowel, active or latent, invariably precedes the formation of liver abscess, although it frequently gives rise to no symptoms of a dysenteric nature, being often limited to the cæcum and upper part of the large intestine.

*Duration of the Presuppurative Febrile Stage of Liver Abscess Formation.*—Every medical man who has had much experience of tropical liver abscess must have been struck by the frequency with which signs of the presence of pus in the organ have been preceded by prolonged fever, often with no localising signs for weeks, and occasionally even months. In the absence of facilities for obtaining expert examinations of the blood such patients were commonly treated as malaria, or some doubtful form of pyrexia. Thus, out of fifty-two cases of liver abscess in Europeans in Calcutta, of which I have analysed the notes on this point, in only two was the history of fever of under a week's duration, both being very acute multiple abscesses. In eight it was from one to two weeks, including cases diagnosed very early by blood counts and X-rays, several of them having been small abscesses in the left lobe. In twenty-five fever had lasted a month or over, and in the remaining seventeen for between two weeks and a month. In native patients the histories are, on the average, much longer. There is, then, plenty of time in the very great majority of cases for the use of an abortive treatment, should such be available, and the nature of the case be recognised early.

*Diagnosis and Cure of the Presuppurative Stage of Amœbic Hepatitis.*—The problem therefore resolves itself into finding how to diagnose amœbic hepatitis before the onset of actual suppuration and how to rapidly cure it, a difficult enough task at first sight, but one which I have good reason to believe I have been fortunate enough to accomplish. When examining the blood of 1,350

consecutive fever patients in the European General Hospital during two years, I met with a group of cases showing leucocytosis without any marked increase of the polynuclears, which usually numbered from 70 to 80 per cent. Most, but not all, of them, showed more or less marked signs of hepatitis and many of them had been suffering from fever for several weeks. In five, the local symptoms were so acute, that the liver was explored for pus with a negative result. I had previously seen similar cases, some of which ultimately developed a liver abscess, while others had got quite well under medicinal treatment. I therefore recognised that this type of leucocytosis might occur in acute, and presumably amœbic, hepatitis long before actual suppuration took place. As already mentioned, I had satisfied myself that tropical suppurative hepatitis is always preceded by amœbic ulceration of the large bowel, although this is often latent and not revealed by any evident symptoms. Moreover, I had by this time come to the conclusion that ipecacuanha is of especial value in the treatment of amœbic dysentery. It was but a logical step forward to think that the best treatment for pre-suppurative amœbic hepatitis was to try to cure the exciting ulcers in the large intestine by the administration of large doses of ipecacuanha, even when there were no actual symptoms of dysentery present, and no previous history of that disease obtainable. The results of this plan have far exceeded my most sanguine expectations, and can be most simply summarised by the statement that during the four years this treatment has been regularly used in the open wards of the Calcutta General Hospital no single patient has developed a liver abscess after admission, although that frequent sequel of acute hepatitis was only too common in earlier years. A number of patients sent, sometimes from other provinces, for operation for liver abscess have got quite well under this drug alone, having been received just in time, and in several there was actual œdema over the ribs, so that the possibility of original encystment of a small abscess under this treatment suggests itself as a possibility. I have notes of over fifty cases of hepatitis, mostly very acute, which have cleared up under ipecacuanha after having had fever for any period up to over fifty days before coming under the treatment. In short, I now go so far as to say that amœbic abscess of the liver is a preventable disease in the vast majority of patients coming early under skilled medical treatment, as soldiers do, and ought soon to become a very exceptional occurrence. Suppuration of the liver should cause serious questionings in the mind of the medical man in whose hands it has been allowed to develop.

Cases showing well-marked signs of acute hepatitis, especially

if preceded by dysentery, present no difficulties of diagnosis. Exceptional cases occur in which the onset is much more insidious with fever and sweats, but no very definite local symptoms. In several such cases I have been led to a correct diagnosis by finding the peculiar type of leucocytosis above mentioned, and the prompt and final fall of temperature within a very few days of putting the patient on ipecacuanha has confirmed the conclusion arrived at. It is these insidious cases which not rarely end in the sudden coughing up of a liver abscess which had not previously been suspected. It is worth mentioning that about half a dozen such cases have rapidly improved under ipecacuanha treatment after the abscess had burst into the lungs, a serious operation having thus been rendered unnecessary. The charts of a number of cases of acute hepatitis rapidly cured by this treatment will be found in the *Practitioner* of June, 1907, and in my book on "Fevers in the Tropics," so further cases need not be given here. The first sign of improvement is a decrease of the hepatic pain, which is commonly much less after one or two full doses. After two to six days the temperature usually falls to normal, and the acute symptoms will have all subsided. The enlargement of the liver next goes down, but it is always advisable to continue the drug in decreasing doses and with longer intervals for at least two weeks, and preferably longer, as two of my earliest cases, in which it was left off directly the fever and pain ceased, developed liver abscesses some months later.

*Methods of Administering Ipecacuanha.* — One of the reasons why this invaluable drug has fallen into undeserved neglect is the great nausea and sickness produced by the large doses which are essential to obtaining its full therapeutic effect. These drawbacks are only to some extent minimised by the usual plan of giving a dose of tincture of opium or 20 grains of chloral hydrate a short time before 20 to 30 grains of the powdered ipecacuanha. In order to get over this difficulty I have had 5-grain doses of the drug put up in keratinised capsules, four to six being given at one time. As they do not dissolve in the stomach they pass intact into the intestine, where their action is desired. By this means the nausea is greatly lessened, and if any results from the action of the drug on the nerve centres, it will already have done its work and cannot be rejected from the stomach. Another good plan for hospital practice is to make fresh 5-grain pills, melt some salol in a teaspoon and brush a thick coat over the pills, which also serves to protect them from the secretion of the stomach. I only give one full dose in the twenty-four hours, preferably late at night on an empty stomach, when the effects are often slept through without

discomfort. By these means the unpleasantness of the treatment can be largely prevented and becomes nothing compared to the relief it affords in the class of cases under consideration. Personally, I am one of those who consider that ipecacuanha has been really too much neglected in the treatment of dysentery owing to the greater use of saline treatment, and in view of the great difficulty in differentiating clinically between the various forms of that disease, I never assume the responsibility of allowing a patient, whose dysentery has not cleared up in a day or two under salts, to leave hospital without giving some ipecacuanha. The fact, which Lieutenant-Colonel Aldridge has pointed out to me, that the death-rate from dysentery has markedly decreased during the last few years, while that from liver abscess remained stationary up to 1907, suggests to my mind that ipecacuanha is not now used in the treatment of dysentery in the British Army in India to the extent that is advisable.

*The Treatment of Liver Abscess without Drainage.*—Although the primary object of this note is to draw renewed attention to the practicability of preventing the formation of tropical liver abscesses in British troops, I desire, however, to take this opportunity of adding a few words on the treatment of liver abscess when already formed, by aspirating and injecting quinine into the cavity without draining. I suggested this plan as early as July, 1902, and published two successful cases in 1906. The very success of the preventative treatment above described prevented me from getting further trials of this plan until recently. Several favourable cases have been reported in the meantime by others, notably the three published in this Journal early in 1909 by Major Spencer, of the Royal Army Medical College, who has strongly commended it to the notice of his brother officers as at least worthy of trial in all suitable cases before an open operation is undertaken. During the last few months it has been more extensively tested by Major C. R. Stevens, I.M.S., who will shortly publish his results, but I may say it has led to a remarkable reduction in the mortality. Two or three aspirations and injections are often necessary, as in the first of Major Spencer's cases, but in one recent instance a single injection cured a liver abscess from which six pints of pus had been aspirated at one sitting, the patient putting on 18 lb. in weight during the next two months. Need anything more be said to prove the method to be worthy of a trial? At the present time it bids fair to render the use of the flexible-sheathed trocar for sterile drainage of liver abscess which I described last year but rarely necessary.

A TOUR OF INVESTIGATION AS TO THE PREVALENCE OF "KALA-AZAR" IN KASSALA AND BLUE NILE DISTRICTS, SUDAN, FROM JANUARY 12<sup>TH</sup> TO MAY 16<sup>TH</sup>, 1909.<sup>1</sup>

BY CAPTAIN L. BOUSFIELD.

*Royal Army Medical Corps, Bimbashi, Medical Corps, Egyptian Army.*

THIS tour lasted from January 12th to May 16th, 1909, and was restricted mainly to the investigation of the prevalence of kala-azar in the parts visited, as but little time could be employed in attempting to solve the important problem as to the method of the transmission of the disease.

In 124 days some 1,300 miles had to be traversed, 900 of which were by camel, and this restricted the stay in many places to thirty-six or forty-eight hours. Further, quite half of the available time had to be spent in general medical work, for there are no doctors or hospitals except at Kassala, Gedarif, and Singa.

The time at my disposal was totally inadequate to form even a really reliable estimate of the amount of kala-azar in the smaller towns and villages, since in nearly every place it was extremely difficult to get the natives to come willingly for medical advice and treatment, or to obtain information of those sick in their tukls.

It takes some time to gain the confidence of the people, a thing almost impossible in a stay of a day or two, and it is also an undoubted fact that it is extremely difficult to diagnose early cases of kala-azar, unless observations are continued for some days.

Prior to starting on the tour notices were sent to inspectors, mamours, ondahs, and sheikhs, asking for information on the disease, and any suspicious cases to be ready for me on my arrival.

In all places where English or Egyptian officials are stationed, except Sennar, much useful information and help was afforded, but the notices sent to the sheikhs were a complete failure, and only at Sofi had any attempt been made to get the required information ready for me.

Instructions on the signs and symptoms of this disease, together with preventive measures, had been prepared in Arabic for the sheikhs, &c., but in a very short time I desisted from distributing them, owing to the illiterate condition of the sheikhs, and the fact

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<sup>1</sup> Final Report.

that most of those who could read seemed quite unable to grasp the meaning of the notices.

The following places were visited in order : Kassala, Tomat, Sofi, Wad Helelwa, Gedarif, Shesheina, Abu Galud, Gallabat, Tukelein, Seraf Saylied, Doka, Kom Shetta, Matna, Galel el Nabl, Wad Shusha, Mafaza, Lueisa, Singa, Abdin, Sennar, and Costi.

### *Methods of Procedures.*

In places where there were hospitals and doctors much information was at hand and the patients were seen in hospital ; however, it must kept in mind that even in stations where there are permanent hospitals probably less than a third of the sick come for treatment, and the remainder are probably unknown to the medical authorities. In most cases troops, police, and schools were inspected.

In villages sheiks were summoned and told to bring those who were sick for treatment, and were informed that any who were seriously ill would be visited in their houses.

In nearly every instance the sheikh at first replied that there were no people ill, and it was often necessary to send them out twice to find those who were ill, and in some cases even then none came for treatment. The sheikh was then informed that a house-to-house inspection would be made, and he would be punished if any people seriously ill were found. This usually had the desired effect, and after a few had been seen others readily came for treatment ; but to insure seeing all, several days at least at each village are required.

At Gallabat a tukl was used as an inspection room, and the natives readily came until I insisted on the isolation of a woman with acute kala-azar. From that day onwards I saw no new cases, so in other stations I did not insist on isolation until just before my departure, as, had I done so, I should have seen no more of the sick inhabitants. At Mafaza and Sennar a house-to-house inspection was carried out in company with the manour, sheikhs, and sanitary barber.

I am quite sure that the natives have only to be visited a few times in this way by a doctor to obtain their confidence and their ready acquiescence in medical inspection and treatment.

Since the stay in a village was often so short, it was considered advisable to go direct for the definite diagnosis by the surest method—*i.e.*, spleen puncture—and the method employed is described in detail further on.

A preliminary report was submitted on May 18th, 1909, dealing with the disease in general, together with measures recommended to combat the spread of the disease.

This further report requires more time to elaborate and deals more fully with the disease from a medical and pathological standpoint. The number of cases and some of the information in this report differ slightly from those of the first owing to further information and work; thus four new cases are added, which are as follows:—

(1) A case considered suspiciously like “kala-azar” died at Singa, and on further search through the films typical parasites were found.

(2) A case contracted at Singa was found in Military Hospital, Khartoum, on my return, and the parasites had been demonstrated at the Gordon College Laboratories.

(3) In a suspected case in the Military Hospital, Khartoum, I found the Leishman bodies; the disease was contracted at Keili.

(4) Bimbashi Archibald found typical parasites in the blood of the official from Sennar, whose servants had been found to be badly infected with the disease.

In the table on the next page are given:—

(1) The towns.

(2) Number of patients treated.

(3) Cases of “kala-azar” subdivided into three classes: (a) Those proved by finding the parasite; (b) those clinically certain; (c) those which raised very grave suspicions of the disease.

It will be thus seen that the total number of cases proved and suspected is fifty-seven, and of these in twenty-three the typical parasite was found.

As pointed out in the preliminary report, the condition found on the Blue Nile is serious, for only three places were visited, Sennar, Abdin, and Singa—and yet these three have produced ten cases definitely diagnosed—and the Blue Nile is now known to have supplied twenty-three proved or suspected cases; or twenty-five if the two police, who went to Mafaza for two months in 1907 really contracted the disease at Singa before going to Mafaza.

As far as I can ascertain, there have now been forty-two proved cases of “kala-azar” in the Sudan, and of these fifteen at least contracted the disease on the Blue Nile, and it is all the more striking since much less investigation and work with regard to this disease has been carried out in this district than in Kassala Province.

Of these forty-two cases, forty-one have been diagnosed since

# 164      *Investigation into Prevalence of "Kala-azar"*

May, 1907, and have been contracted either on the Blue Nile or in Kassala Province.

These facts force one to believe that, firstly, the Blue Nile is the most extensively infected district, and, secondly, that the disease is in all probability a new arrival.

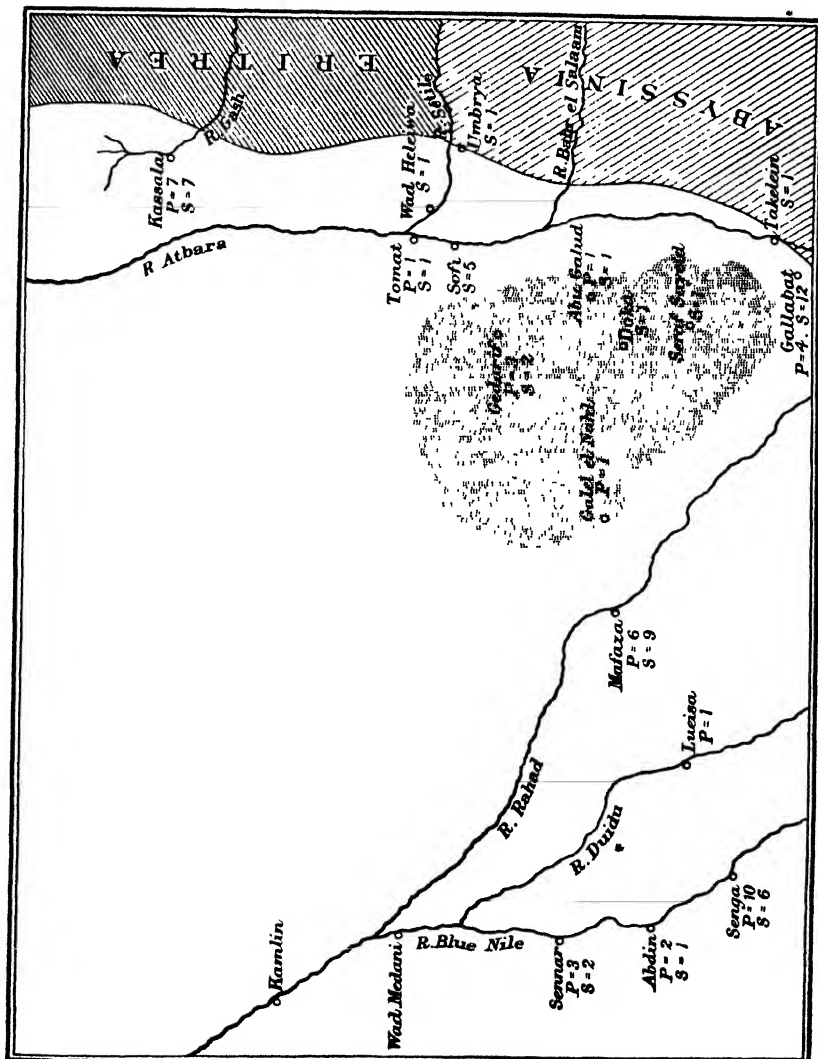
Province	Place	Number of patients treated	KALA-AZAR			Total proved and suspected
			Proved	Clinically certain	Highly suspicious	
Kassala	Kassala .. ..	Hospital	1	2	3	6
	Tomat .. ..	12	1	—	—	1
	Sofi .. ..	12	—	2	1	3
	Wad Helelwa .. ..	7	—	1	—	1
	Gedarif .. ..	Hospital	3	—	2	5
	Shesheina .. ..	19	—	—	—	0
	Abu Galud .. ..	21	1	1	—	2
	Seraf Sayleid .. ..	12	—	—	1	1
	Gallabat .. ..	161	3	4	3	10
	Tukelein .. ..	4	—	—	1	1
	Doka .. ..	5	—	1	—	1
	Kom Shetta .. ..	14	—	—	—	0
	Matna .. ..	9	—	—	—	0
	Galel el Nahl .. ..	7	1	—	—	1
	Wad Shusha .. ..	None could be induced to attend for treatment	—	—	—	—
Blue Nile	Mafaza .. ..	152	1	2	2	5
	Keili .. ..	—	1	—	—	1
	Lueisa .. ..	9	1	—	—	1
Blue Nile	Singa .. ..	Hospital	5	3	2	10
	Abdin .. ..	25	2	1	—	3
	Sennar .. ..	152	3	6	2	5
White Nile	Costi .. ..	6	—	—	—	0
Total ..		627	23	17	17	57

So far the disease has been found mainly amongst Government officials and employees, a fact not remarkable when one considers their opportunities and desire for medical treatment.

The places so far known to be considerably infected are Kassala, Gallabat, and Mafaza in the Kassala Province, and Singa, Abdin, and Sennar on the Blue Nile.

The map shows the distribution of the cases proved and suspected, and an attempt has been made to piece together all available information, so that the map is a composite of all known cases in these stations and does not represent the numbers seen on this tour.

Rough map, showing distribution of Kala Azar.



The Sudan area (dotted tint) may be considered to be practically free, except from imported cases.

Key--

P = Definitely proved cases.

S = Suspected cases.

To these cases must be added—

- (1) From White Nile (one).
- (2) Late Dr. Pirrie.
- (3) From Keili (one).
- (4) From Senga (one).

The shaded area may be considered practically free from the disease, since of those discovered in this region—

(1) The three at Gedarif did not contract the disease there, and both the suspected cases came from elsewhere ;

(2) The case at Galel el Nahl almost certainly contracted it at Mafaza, and an inspection of the whole population showed no others likely to be suffering from "kala-azar" ;

(3) The two cases at Abu Galud and the one at Doka cannot be accounted for, but only one was definitely proved by finding the parasite ;

(4) The case at Seraf Sayeid was an old woman, who may possibly have been suffering from malignant disease and was seen but once.

Thus it seems probable that, as in India, the disease tends to cling to river banks, but it is to be noted that in none of these places was I able to stay longer than two days, a time totally insufficient to gain a very reliable knowledge as to the existence of cases. However, it can be definitely stated that the disease exists to no large extent in these towns and villages at present. Stops extending to a week or more were made only at Gallabat, Mafaza, Singa, and Sennar.

The main centres of the disease among the places visited are Kassala, Gallabat, Mafaza, Singa, and Sennar. It is a remarkable fact that most of these places are visited by Abyssinians. Kassala has a large permanent population of this race. Gallabat is absolutely on the Abyssinian-Sudan frontier, and is one of the main trade routes between these two countries. This race may have introduced the disease into Mafaza, for early in 1908 I found one of them severely infected and who appeared to have had it some considerable time ; however, there is the possibility of its having been introduced by two policemen from Singa on the Blue Nile. There are a certain number of Abyssinians in Singa and Sennar, but I understand their number is not great.

In Kassala province during 1908 Abyssinians supplied 37 per cent. of the cases, which is remarkable when one considers their comparatively small numbers with regard to the other inhabitants ; but during this tour only three were found, and none were definitely diagnosed. Further, it seems probable that the small epidemic at Sennar was started by an Abyssinian syce. This point, however, must still be considered to be *sub judice*.

It is of the utmost importance to find out whether this is the beginning of the disease in a new country, or whether these are but

cases left behind in the track of a previous epidemic. Considerable time and trouble have been spent in trying to elucidate this point, and the imperfect and unreliable information obtained makes one conclude that probably the disease is a new arrival amongst a previously uninfected people, and therefore much more liable to take on an epidemic character.

The earliest reference to these parts that I can find is in Sir Samuel Baker's "*The Nile Tributaries of Abyssinia*," written in 1861. In Chapter VIII. he states that at least 50 per cent. of the population had a permanent enlargement of the spleen, which could be felt by a slight pressure of the hand, frequently as large as an orange. This is of no great value, since the observation was made during the khareef (rainy season) and no reference is made to a great mortality, but I am certain that now nothing like 50 per cent. of the inhabitants show permanent enlargement of the spleen, and I doubt very much if malarial conditions have improved in this town. Further, the enlargement to the size of an orange means a very much enlarged spleen, especially when thus observed by a layman. Along the Atbara I have been surprised to find that, excluding Gallabat, it is the exception rather than the rule to find a palpable spleen.

I have questioned many old men and old sheikhs on the prevalence of such a fever during the Mahdi's and Khalifa's time, but could gain no definite news, except that they could not remember it and were almost certain there was no great mortality from such a fever.

Sheikh Adam Idris of Abdin informed me that ten years ago he visited Lueisa and that the fever there was very severe and very fatal; however, he could give me no description of the disease. This is interesting, as it was in this village that I found the most chronic case of "*kala-azar*" I have seen in the Sudan, a case of over five years' duration in a man who had been in Lueisa for the previous seven years.

Referring now to more reliable sources, I must thank Sagh Mohammed Eff Niklawi for much information on this subject. He was at Omdurman Hospital early in 1899 and remembers a large number of Egyptian soldiers, perhaps fifty, returning from the Blue Nile suffering from fever, which in many cases did not react to quinine, which was sometimes administered in 30-grain doses, and one showed marked enlargement of spleen and liver with great wasting. He believes many died, and recollects four or five such deaths in his wards.

This information is suggestive of "kala-azar," but Niklawi Eff was not very definite, the lapse of time—ten years—making it almost impossible to obtain definite facts.

In answer to a letter asking for information on this subject, Dr. Abdel Latiff Eff Ahmed, late Yousbashi Medical Corps, who was at Sennar at the end of 1898 and the beginning of 1899, and again in 1901 and 1902, very kindly supplied me with these statements:—

(1) The fever was serious and often fatal in forty-eight hours to one week. Patients who did well took ten to fifteen days to recover, but were liable to relapses.

(2) Quinine was very effective.

(3) Average number deaths from fever in 1898 and 1899 at Sennar and Karkoj was 7 to 10 per cent.

(4) About 90 per cent. were ill with fever. If the fever became chronic it lasted usually six months, and the patients became debilitated and died.

(5) Many natives with prominent abdomens, large spleens and livers were seen. In some cases the spleen filled the abdomen, and the natives called such cases "patients from the son of fever." This condition had always been accompanied by very severe debility, but it was very rare amongst the troops.

(6) Fever patients did not suffer from diarrhœa, but rather from constipation.

It has to be remembered that these statements may not be strictly correct, since they are based on recollections of events ten years ago and not on actual notes made at the time; but they tend to uphold the view that the vast majority of cases were malarial, and not "kala-azar."

On return to Khartoum I examined the medical reports of 1898 and 1899.

In the annual report from the Blue Nile in 1898 it is stated "The stations on the Blue Nile are exceedingly unhealthy, and often fatal to Europeans. They are the home of malaria in its worst forms, including intermittent, remittent, and malignant types. So unhealthy are they that the Sirdar has decided to withdraw most of the troops towards the close of the rainy season, leaving only scanty garrisons until the danger is over, which is, roughly, at the end of November."

El Kaim R. H. Penton Bey in the Annual Return, Omdurman District, 1898, states:—

"Invalids from the Blue Nile are bloodless, emaciated, and

thoroughly broken down. Convalescence is slow and frequently interrupted with attacks of fever. Change of air for restoration to health is imperative.

"Invalids from the White Nile are not so thoroughly broken down, and therefore recover more quickly. Sennar, Karkoj, and Rosaires on the Blue Nile are quite unfit for human habitation during and after the rainy season. This applies to the Europeans and Egyptians especially, though the blacks also suffer and are only exempt, as a rule, from severe and fatal attacks. At no time of the year does the Blue Nile appear to be exempt from malaria. A cursory examination of the inhabitants will show that it cannot be otherwise than unhealthy, and malarial cachexia is apparent in every village. . . . The expenditure of quinine in this district has been 41 lb. in five months and 8,000 pills of 5 grains and 3 grains each."

On referring to the number of troops in this district it was found that the 3rd Battalion (Egyptian) 30th Camel Corps and 10th Sudanese Battalion were stationed on the Blue Nile, and the 12th Sudanese and 25th Camel Corps at Gedarif, the total being probably less than 2,500, so that the amount of quinine used was considerable, especially when one considers that two out of the three battalions were Sudanese.

An extract from this report reads as follows:—

"By no means a small proportion of these [fever cases] have been due to recrudescence of fever contracted in 1898."

Amongst the deaths are mentioned fourteen from intermittent fever, and six from remittent. "Debility" caused 374 admissions, and of these 222 were invalided north, and 108 invalided from the service.

The extreme importance of trying to find out if "kala-azar" was present at this period has caused the inclusion of all these statements, for the prognosis from an epidemic point of view depends largely on the fact whether this is a new disease or not. The most hopeful points in these reports to my mind are:—

(1) Invalids from the Blue Nile were bloodless, *emaciated*, and thoroughly broken down.

(2) Invalids from the White Nile, an equally malarial district, compared very favourably with those from the Blue Nile.

(3) Malarial cachexia is apparent in every village on cursory examination. This undoubtedly is not a fact now at Sennar, Singa, Abdin, and Wad Medani, and such cases have to be most carefully sought for, and, further, "malarial cachexia," was the term

nearly always applied in India to cases now known to be "kala-azar," before this disease was separated from the malarial fevers.

(4) In spite of large quantities of quinine, the troops suffered badly from fever; practically two-thirds of these troops were Sudanese, who are much less liable to fever than the Egyptians.

(5) The percentage of those invalided from the Service for "debility" seems extremely high, if from pure malaria which had been treated thoroughly with quinine.

Further, as far as my knowledge goes, judging from the present day, malignant malaria is not very common on the Blue Nile, and therefore presumably was not very common at that date. It has been quite impossible to trace what happened to the invalided men.

On considering these reports it was thought advisable to write and ask Lieutenant-Colonel Penton for his opinion on the condition, viewed in the light of our present knowledge of the disease, but so far no reply has been received.

In no place was the disease in any way evident, and cases had to be found by careful inquiry and examination. The following facts are cited to show that in some cases the disease is epidemic to a limited degree even at the present time, though in the vast majority of cases I could only find single individuals attacked, the other members of the family or compound showing no signs of the disease.

(1) On arrival at Sennar two servants of an official were found to be seriously ill with "kala-azar"; one died on May 4th, 1909, and the other was in a dying condition. On inquiry it was found that of the other servants an Abyssinian syce had been ill with fever for two months, was very emaciated, had a large spleen, and died in Khartoum early in 1908. The safragi (personal servant) had been ill with fever several months, was wasted, had a prominent abdomen and large spleen, went to Khartoum at the same time, and died there.

A marmiton, a Sudanese boy, lived in the same tukls for two months, but being discontented with his pay returned home to the Mustamareen, near Singa, and shortly afterwards became very ill with fever, which lasted a few months and ended fatally.

On my return to Khartoum inquiries were made about these two servants, who were reported to have died early in 1908, but it was found they did not die in hospital.

Dr. Squires, of the Soudan Medical Department, very kindly supplied me with the following information:—The Abyssinian syce,

aged 15, was admitted on January 7th, 1908, with fever and enlarged spleen, and discharged on February 9th, 1908. Re-admitted February 16th, 1908, when malarial parasites were found in the blood. Temperature was  $102^{\circ}$  to  $99^{\circ}$  for two weeks, and then fell to normal. Leishman-Donovan bodies were looked for but not found and he was discharged on March 8th, 1908.

The safragi, a Dinka, aged 17, was admitted November 23rd, 1907, with intermittent fever and enlarged spleen. There was high fever for five days, but after hypodermic injections of quinine the temperature fell to normal in three days. No malarial parasites were found, and he was discharged on December 5th, 1907.

The Mudir of Khartoum was asked to supply information as to the death registration of these cases, and very kindly made inquiries, but could not find any record of these deaths. Thus, it is uncertain whether they died, but several informants at Sennar were very definite in their statements that these two had died in Khartoum.

The official was known to have been slightly ill off and on with fever, and his peripheral blood was examined at Khartoum by Bimbashi Archibald at the Research Laboratories, and he reported the presence of typical Leishman-Donovan bodies.

(2) At Mafaza the disease has been more or less epidemic, since it is now known that of those who have inhabited the police lines between August 27th, 1907, and April 8th, 1909, eight have died of this disease, while another policeman, the sub-mamour and his two servants almost certainly succumbed to "kala-azar."

(3) At Abdin two brothers were found, one suffering from definite "kala-azar," while the other had been ill for two years with fever, and had a spleen reaching to the umbilicus.

Another case in this village had been ill, according to his statement, only fifteen days, and the peripheral blood was examined, supposing it to be a case of malaria, but typical Leishman parasites were found.

(4) The possible infection of the Third Company of the Arab Battalion is dealt with in detail later on. There was practically no time available to study this point, but the following facts were forced on one's mind:—

(a) Bed bugs are extremely common; quite 75 per cent. of the native angareebhs harbour them;

(b) Angareebhs in places away from the river banks seem to harbour bugs just as frequently as those in places situated on the rivers.

The following facts, with reference to the presence or absence of bugs, were ascertained in 20 cases of "kalar-azar":—

- (1) Live bed bugs found in 8 instances ;
- (2) Fresh eggs, but no live bed bugs found in 4 instances ;
- (3) No signs of bugs or their eggs in 4 instances ;
- (4) Those who did not use angareebes or had not used them in the place were obviously ill in 4 instances.

All the bugs examined were believed to be *Cimex lectularius*, owing to their presenting distinctly flattened or concave edges on the dorsal aspect of the pro-thorax.

So far, *Cimex rotundatus*, which is held to convey the disease in India, has not been found in the Soudan, though Mr. King, the Entomologist at the Gordon College, informs me they have been found on Yemenese pilgrims at Port Sudan and Suakim. The disease in the Sudan certainly seems to spread in some cases through the members of a household or compound, and suggests that the disease may be conveyed by the bed bug ; but against this view, however, is the striking fact that in the Sudan, as in India, the disease appears to cling to river banks and yet bed bugs are equally common in places on and away from the river, and infected persons must frequently be visiting these places off the river. Further, in the Sudan, the villages off the river are at a very slightly greater altitude than those on the banks, and I doubt if the temperature or humidity of air or soil is greater ; for where a village is, there of necessity must be water, either at hand or very adjacent.

On the angareebes of patients chicken ticks were noted on three occasions, and camel ticks and cockroaches in many instances. One point was observed and is worth mentioning ; the popular belief, which I have often heard expressed, that angareebes strung with strips of hide do not harbour bugs is quite fallacious, as many such angareebes were seen teeming with these pests. In view of the possibility of the disease being carried from domestic animals to human beings, the animals kept in the tukls or hooshes of those suffering from "kala-azar" were noted, and in no instances were animals, evidently ill, discovered.

The following were found : Dogs in six instances ; chickens in seven instances ; sheep in one instance ; goats in two instances. Camels were never found in the hooshes, and apparently none of the cases were intimately associated with these animals.

Special attention was paid to dogs, but those living with the patients did not appear in any way ill, and the only parasites noted on them were ticks—fleas were never seen. Two dogs were killed and examined, and the results are given later on : one, a very healthy

looking animal, presented structures very similar to "kala-azar" parasites.

Trade, habits, and food seemed in no way connected with the transmission of the disease, but it still has to be determined whether river water or the eating of fish may not be a means of conveying the disease in the Sudan, a possibility in view of the tendency of the disease to cling to river-side villages.

The disease runs in many cases a very severe and rapid course, and of those diagnosed on this tour eight are known to be already dead. The average duration of the illness, according to the statements of the various patients, who, however, are not by any means entirely to be relied upon, was twenty-one and a half weeks, while five terminated fatally in thirteen weeks. Nine cases gave a history of illness of less than three months, while five more stated the disease lasted five months or less. The most rapid case was that of a woman aged about 18, at Kassala; she and her husband were most definite in their assertions that she had been ill only twenty days before admission to hospital in an extremely serious condition, where she died six days later.

A boy, aged about 16, at Abdin had a spleen enlarged to within an inch of the umbilicus, and looked seriously ill; he very positively declared he had been ill only fifteen days and had no previous attacks of fever. Peripheral blood was taken with the expectation of finding malignant tertian parasites, but no malaria was found, while typical Leishman bodies were discovered. About ten days later Bimbashi Drew, Medical Corps, saw the man and informed me he considered the case was rapidly going downhill and he thought the man would not live long.

Chronic cases were seldom seen; three, however, gave histories of five years (Lueisa), three years (Abdin), and two years (Abu Galud) respectively.

The following points make one inclined to the view that the disease is a new arrival amongst a previously uninfected people: (1) The virulent character; (2) the comparatively few chronic cases observed (this, in my opinion, is a very suggestive fact); (3) the epidemic character the disease has assumed at Mafaza and Sennar; (4) the absence of history of a past epidemic, though this is naturally extremely difficult to determine owing to the ever-present malaria after the rainy season both near and away from the rivers; (5) the failure of medical recognition, though it must be kept in mind that the disease has been but comparatively recently separated from malaria and many medical men are still ignorant of it.

If the disease is a recent arrival, then, considering its extremely insidious onset amongst a population, it behoves the Government to take most energetic steps to prevent it getting a large hold on the people and to prevent an extensive epidemic in the near future.

No information was obtained as to the incubation period of the disease, though much attention was paid to this point.

A boy with "kala-azar" at Galel el Nahl, where the disease appears to have been unknown and where all the other inhabitants showed no signs of disease, went to Mafaza, where the disease is well known to exist, stayed there two days, returned, taking two days over the journey, and fourteen days later became ill with severe fever. I could find no cases in the hoosh where he stayed at Mafaza, but, if contracted there, the incubation was sixteen to eighteen days.

*The incidence* of the disease appears to favour the months of July, December, and January, which correspond to the commencement of the cool and rainy season and the few months following the end of that season. It is often quite impossible to obtain definite information from a native about the date of onset, but the following table gives the approximate months of onset of all the cases, proved or suspected, that I have been able to follow:—

KALA-AZAR CASES.

Month	Proved	Suspected	Total
January .. ..	5	3	8
February .. ..	2	3	5
March .. ..	1	2	3
April .. ..	1	2	3
May .. ..	—	—	—
June .. ..	—	1	1
July .. ..	6	—	6
August .. ..	—	5	5
September .. ..	2	—	2
October .. ..	1	—	1
November .. ..	—	7	7
December .. ..	5	—	5

Many described their illness as starting during the khareef (rainy season), but gave no definite information. The number is too small to allow any reliable deductions, but it seems to point to the onset being during the rainy or cool season, or the few months following it which are also cool; possibly the cases occurring during July and August are those infected at the end of the previous cool weather, the disease lying dormant during the ensuing hot months. The objection may naturally be raised that suspicious cases should not be included in this report and in the above table, but this appears to me justifiable when the fact is considered that thirteen cases were thought to be suspiciously like "kala-azar" at the end

of 1907 and at the beginning of 1908 in Kasala Province, and in July of that year nine of these had succumbed. This, to my mind, largely upholds the diagnosis, especially as they all had considerable quinine treatment and spleno-medullary leucocythemia is out of court, and indeed is scarcely ever seen in the Sudan.

A point to be carefully remembered in the Sudan is that it is quite common for a "kala-azar" patient to have had malaria and to give a history of fever every alternate day, probably recognising the malarial paroxysms while failing to recognise the fever on the intermediate days.

The average age of those affected was about 18 years, the eldest being about 40, and the youngest about 6. These figures are only approximate, as the ages had of course to be judged on appearance and medical examination.

Nineteen out of the twenty-two were males, the three females being extremely ill, and, in fact, manifestly moribund, when seen.

This great preponderance of males over females only illustrates the difficulty a doctor experiences in seeing the female population of a Mohammedan community; and though in some cases a house-to-house inspection was made, yet it is quite easy to hide or remove any sick female, so that they escape observation.

Probably the disease attacks sexes equally in the Sudan, and if carried by the bed bug one would expect the females to be more infected than the males, owing to their being more occupied in the tukks.

There seemed to be no special selection with regard to nationality or tribe. The Arabs, being the most numerous, naturally supplied most cases, and other tribes were represented, such as Beniamia, Jaalin, Bagara, Shaagi, &c. Many were of mixed blood, usually Arab father and slave Sudani mother.

The attached table gives the nationality:—

Nationality		Kala-azar		Suspected Kala-azar		Total
Arab ..	..	13	..	20	..	33
Sudani	..	5	..	1	..	6
Mixed origin	..	2	..	8	..	10
Egyptian	..	2	..	1	..	3
Abyssinian	..	—	..	3	..	3
Turk	..	—	..	2	..	2

It is also worthy of note that four Englishmen have been reported as contracting the disease in the Sudan.

Full dependence cannot be placed on the registration of deaths, since the information is gained from sheikhs, sanitary barbers, &c. ;

however, they are more to be depended upon than the registration of births.

The following table gives the registration of deaths at some of the bigger centres:—

Station	1906	1907	1908	1909 (till end of March)
Kassala ..	183	299	180	—
Gallabat ..	26	137	81	—
Gedarif ..	311	254	293	—
Mafaza ..	53	104	118	—
Singa ..	—	224	361	109
Sennar ..	—	162	120	44

Thus it would appear that the death-rate is rising considerably in Singa, Gallabat, and Mafaza, especially in the first-named town. The fallacies are that the populations of these towns vary greatly, often year by year, and, further, every year probably sees an improvement in the number registered.

However, I believe the death-rate at Singa is increasing in a greater ratio than is the population; it is to be noted that 109 deaths were registered up to the end of March, and if this be kept up for the three remaining quarters, then the total for 1909 will be 436. The death-rate is usually greater in the latter half—*i.e.*, during the rains and subsequently feverish period—than in the first half of the year, so that probably this total will be exceeded and the death-rate will have *more than doubled in three years*.

*The onset* was either by short attacks of fever, frequently repeated, or by a serious continuous attack.

No prolonged and continuous observations could be made on the type of fever, since the patients were seldom seen on more than two or three occasions. In three cases which were observed for some days, two, acute cases, showed a double remittent fever, and in the third, a subacute case, which had lasted nearly a year, there was only a single rise during the twenty-four hours. Most of the cases seen within a few days of death had a normal or sub-normal temperature.

The chronic case of five years' duration had a normal temperature, and one of three years' duration had a temperature of 99° F.

*Wasting* was marked, especially in the chronic and very acute cases (see photographs II., III., and VI.). Many of the subacute type showed but slight signs of emaciation, and this renders the diagnosis more difficult, since it is not easy to determine whether some Arabs, who are naturally thin, are wasted, especially as many are poor, and therefore badly fed. Emaciation was marked in eleven cases, slight in eight, and not evident in three.

*Weakness* was noticeable in all cases, but especially in the very acute, while in the subacute it was not very evident.

*Protuberance of the Abdomen.*—In thirteen out of the twenty-two cases the abdomen was *not* prominent, while in several cases it was actually the reverse. Those who had large abdomens were the chronic cases, and the average duration of these cases, when seen, worked out to nineteen months.

The fact that 59 per cent. showed no protuberance is, to my mind, highly suggestive of a new disease, likely to take on an epidemic character. No chronic case was seen without some protuberance of the abdomen, a condition probably essential, and due to nature making accommodation for the greatly enlarged spleen and the enlarged liver.

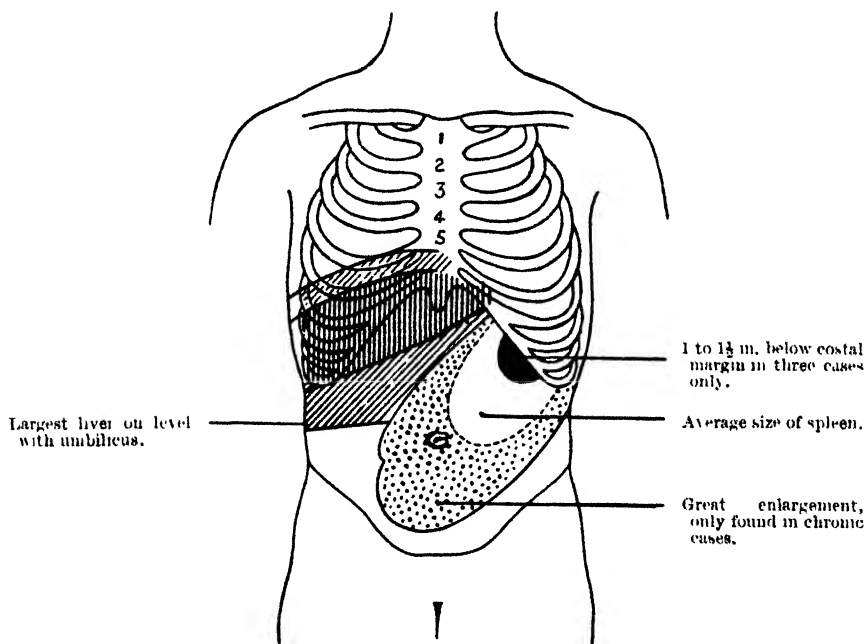


Diagram illustrating various degrees of enlargement of spleen and liver.

*Enlargement of the Spleen.*—In nineteen cases out of the twenty-two the spleen was enlarged to within an inch of the umbilicus or to a greater extent. In the remaining three the spleen was palpable or extended one inch below the costal margin. Many cases complained of slight but lasting attacks of pain in the splenic region. In all cases the enlargement was regular, the edge definite; tenderness on palpation was complained of in three cases.

The diagram shows the various degrees of enlargement of the spleen and liver as noted during this investigation.

Very large spleens were always and only found in chronic cases; the very acute having but comparatively slight enlargement of this organ.

*Enlargement of the Liver.*—In seventeen out of the twenty-two cases the liver was distinctly enlarged, though in most cases to no great degree. The largest extended downwards to the level of the umbilicus and the liver dulness was increased upwards one costal space. In no case was it noted to be smaller than normal. The surface was invariably smooth, edge well defined, and tenderness on palpation was not noted.

In two suspected cases the spleen was not enlarged beyond the costal margin, and liver puncture was performed with negative results.

*Jaundice* was found in two cases, but in neither to a marked degree.

*The conjunctivæ* were distinctly of a yellowish tinge in seven of the twenty-two cases; but this point is often difficult to determine owing to the natural pigmented condition and yellowish coloration of the conjunctivæ often seen amongst the Sudanese.

*Pigmentation* was only once seen, and then it was doubtful if it was due to "kala-azar."

The patient, an Egyptian, was seriously ill with fever and presented a curious bronzing of his face, which was not noted on any other part of his body; this bronzing appeared quite different in type to that usually seen due to the action of the sun. *Anæmia* was marked in nine cases, slight in eight, and not appreciable in five.

In three cases the peripheral blood on withdrawal appeared to the naked eye like slightly turbid serum. There were no special changes noted in skin, hair, or nails, and the nervous system appeared normal in most cases.

Mental depression was very marked in four cases, but all were acutely ill; one case was extremely deaf (no quinine had been taken), the power of speech was greatly impaired, and there was marked mental dulness. This condition had been present about fourteen days and lasted till the day of death, which occurred seven days later. No malignant tertian parasites were found in this case.

*Diarrhœa* was a very marked and serious complication in twelve out of the twenty-two cases. It was often, according to accounts, accompanied by the passage of blood and slime in the stools.

Undoubtedly several cases started their disease with attacks of diarrhœa, and my belief is that the majority had this complication early in the course of the disease.

The type of patients one had to deal with renders the taking of a careful history most difficult and often almost impossible, especially when the patient will on every opportunity refer to an "afrite" (evil spirit); but my firm conviction is that nearly all cases will be found to suffer from diarrhoea, and that usually at the commencement, or in the early stage of the disease as found in the Sudan. In the vast majority of cases the tongue was clean except in the very acute and moribund cases. Sordes on the lips were seen in virulent cases. Two presented marked tenderness over the colon, one presenting some thickening of this structure, and may possibly have been complicated by true dysentery. However, as far as my small experience goes, the diarrhoea is easily combatted by drugs, such as opium and bismuth, but readily reappears on the cessation of treatment.

The frequency of diarrhoea, accompanied by the passage of blood and slime in the stools, naturally suggests the possibility of infection through the alimentary track, and is a point that should be carefully investigated in the Sudan, unless the diarrhoea and blood be due to venous congestion due to the enlarged liver; but dilated veins on the abdomen were never noted, and ascites to a slight degree was seen in one instance only.

*Edema* of the legs was noted five times, one patient presenting oedema of legs, face, and a slight effusion into the peritoneal cavity, while another showed oedema of legs and face. In the few cases where the urine was examined no trace of albumin or bile could be found.

*Suppurative processes* were practically absent. Only one proved case showed some boils scattered over his legs, and one suspicious case had a suppurative condition of the scalp; this is no greater percentage than would be found amongst the general population.

*Pain* was never a marked symptom, though several complained of attacks of pain over the splenic region, these attacks apparently lasting several days and due, possibly, to sudden enlargement of the organ.

*Headache*, pains in the lumbar region and in the shins were sometimes encountered, but invariably accompanied by fairly high fever.

*Epistaxis* was troublesome in one case, and bleeding gums were encountered on several occasions.

*Hæmoptysis* was complained of by one patient, who showed no physical signs of phthisis, and there was no available sputum for examination when the patient was seen.

*Hypostatic congestion of the lungs* was seen in several moribund cases, when the circulation was evidently giving out.

It is much to be regretted that no *post-mortem* examinations were made, but this was next to impossible owing to there being no available place, the tukl being usually in a compound occupied by many other people. Further, the prejudice amongst the natives against such a proceeding is so extremely intense that the performing of an autopsy would ruin all chance of further medical work and would destroy all confidence in a doctor visiting that village for a very long time to come.

The following photographs illustrate various types of the disease as met with in the Sudan :—

- 1.—A subacute case.
- 2.—Comparison between chronic malarial and kala-azar patients.
- 3.—Extremely acute case of "kala-azar."
4. and 5.—A doubtful chronic case of "kala-azar."



CASE 1.

Boy, aged about 9, at Gallabat. Ill probably six months. Limits of spleen and liver delineated in white paint. Emaciation marked. Died March 27, 1909.



"A." CASE 2. "B."



CASE 3.

Case 2.—Two cases at Singa. "A"—Boy with "kala-azar." Ill eleven months. Died May 28, 1909. "B"—Girl from same house, but suffering from profound malarial infection; the spleen blood contained many benign tertian rosettes, though no malarial parasites were found in peripheral blood. This photograph shows plainly the difference in wasting and in the prominence of the abdomen.

Case 3.—A very severe and acute case at Gallabat. Duration three months. Died March 23, 1909. Diagnosed at first as dysentery; marked diarrhoea, with much blood and slime in stools. Descending colon very tender. High fever. Marked wasting, and weakness very pronounced. Enormous number of parasites in spleen blood. Peripheral blood like serum. No malarial parasites found. Spleen not very greatly enlarged.



CASE 4.



CASE 5.

Photographs of same patient. Gallabat. An Abyssinian ill two years. Typical parasites could not be found in spleen blood, though three punctures were performed and seven hours spent over microscopic examination. Weakness and wasting not marked. No malarial parasites in peripheral blood. Liver and spleen enlarged. Wife ill with fever for five months.

One serious point calls for notice—viz., that out of the twenty-three cases only twelve were lying up in bed, and of these four were Government employees, who, I think, had they not had the right to medical treatment in hospital, would have been out and about; thus eleven infected people were walking about and visiting other tukls and mixing with the general population and probably conveying the disease amongst them.

Further, the more seriously ill the case, the greater the tendency of relations and friends to gather in the tukl, and I have frequently seen five or more people in the tukl of a patient very ill with “kala-azar”; often two or more sitting on the angareeb of the patient.

Such a state of things is natural, but it is brought forward to show that the extension of the disease among these people is far more easy than amongst a more civilised population.

*(To be continued.)*

## Clinical and other Notes.

### TECHNIQUE FOR OBTAINING OPSONIC INDICES.

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THERE are plenty of knowledgeable persons about who are ready to explain what opsonic indices are, and how to take them, and I am aware much has been written in the different periodicals on the subject, but the difficulty is where to find the matter. My object in writing these few lines is to supply this want, as when at home I searched the booksellers for literature on the technique and could find none. By chance I came across Dr. Houghton's "Review of Opsonins," and when taking a course at St. Mary's Hospital was given some excellent leaflets on the subject.

For those not instructed in the rudiments or principles of the subject, it might be well to ask the question, What is an "Opsonic Index"? The answer resolves itself into saying that a film or smear is made on an ordinary slide from a mixture (that has been incubated a little) of (1) washed blood corpuscles; (2) bacterial emulsion; (3) patient's serum. This film is appropriately stained, and when examined under the  $\frac{1}{2}$  oil immersion it is seen that phagocytosis has taken place. The microbic contents of, say, 100 polymorphonuclear neutrophils are enumerated, and the number divided by 100 will, therefore, give the average number of bacteria in each white cell; this is called the phagocytic count or content, and should not be less than about three per cell, except for tubercle, which should be about two per cell. A phagocytic count is made in a similar way with (1) washed blood corpuscles; (2) bacterial emulsion; (3) normal or pooled serum; and this latter divided into the former gives the "opsonic index" of the patient against the particular bacterium used in the emulsion.

An example might make it clearer.

(1) From film made with patient's serum it is found that 100 polymorphonuclear cells contain 350 bacilli or cocci.

(2) From film made with control, normal, or pooled serum, 100 polymorphonuclears contain 280 bacilli or cocci; then  $350$  will be the patient's phagocytic count, and  $280$  the control count. Therefore,  $350 \div 280 = 1.25$ , and this is the "Opsonic Index" of the patient against the particular bacillus or coccus used in the emulsion,  $1.0$  being approximately the normal. The technique employed may appear at first simple, but it is only by constant practice that anything approaching reliable results can be obtained. The pitfalls are many, so it is as well at first not to be too dogmatic about conclusions until all technicalities are overcome, and one's results are more or less consistent.

It will be seen that for the estimation of opsonic indices three essentials are necessary, viz. :—

(1) Sera, viz., (a) serum of patient whose opsonic index is required ;  
(b) serum of normal person for control.<sup>1</sup>

(2) Washed corpuscles.

(3) Emulsion of bacteria.

These we will now proceed to prepare *seriatim*, and I place sera first, as during the preparation of the other two time is given for the serum to separate out.

(1) *Sera*.—Both the patient's and normal sera are best collected in the usual manner in glass capsules, which must not be over-heated when sealing in the flame. The blood should also be fresh, as after about five days the fluids have lost about half their opsonising powers. By placing the capsules and their contents into an opsoniser, a name given to a convenient and simple form of incubator at 37° C., for from a quarter to half an hour, the sera will separate from the clot more quickly.

After the clot is formed, and not before, the capsules may be placed in a centrifuge to accelerate the separation if necessary. If the clot has not formed, plasma instead of serum will separate out, and this when mixed with the washed corpuscles and emulsion will produce clotting, thus nullifying results. There is no reason why serum alone should not be sent for examination, put up in a sealed capillary tube, provided, of course, it is not too old when received.

(2) *Washed Corpuscles*.—Take a clean glass tube about 2 inches long, and  $\frac{1}{4}$  inch to  $\frac{1}{2}$  inch in diameter, one end of which is closed. Fill two-thirds of this tube with 1·5 per cent. citrate of soda solution, and the remaining one-third with ordinary blood from the finger.

Before and after centrifuging place the tube with its contents between the forefinger and thumb, and invert it three or four times to mix the citrate solution and blood. It must not be shaken. Centrifuge till the corpuscles just settle. Too much centrifuging is apt to compress the red cells, and cause the leucocytes to adhere to each other. With a pipette and teat, remove as much as possible of the citrate solution, adding in its place 1·86 per cent. sodium chloride solution. Wash by inverting (as was done with the citrate of soda solution) for a minute or so, then pipette off the salt solution. Mix the remaining blood cells intimately by means of a pipette and teat, and a homogeneous mixture of washed corpuscles will be obtained, which will keep for twenty-four hours. •

(3) *Emulsion of Bacteria*.—This is the most difficult part of the technique. It is essential that the living growth from which the culture,

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<sup>1</sup> As one normal serum alone does not give a fair estimation of a normal index, it is usual to take two or three normal sera and mix them. This is called a "pooled serum." The index of each may also be taken separately, and the average of these considered as the normal.

and afterwards the emulsion, is made be a pure one. The age of coliform and Gram-negative cocci should be from about four to ten hours, as if older, they are unlikely to take the stain. Staphylococcal growths on agar may be twelve to twenty-four hours old. Streptococcal growths on agar about the same age, but three or four tubes should be prepared as the growth is usually scanty. Gonococcal<sup>1</sup> growths usually should be four to eight hours, but may be sometimes ten to twelve hours. Emulsions of tubercle bacilli, as will presently be seen, are not usually made directly from a living culture, as the process of obtaining a growth is difficult and tedious. They can be conveniently and easily obtained from dry tuberculin powder.

Having obtained a satisfactory growth, take a loopful and emulsify it with two or three drops of 0.85 percent. NaCl solution in a clean watch-glass. Avoid pouring salt solution on to the growth in the tube. The emulsifying is more satisfactorily carried out with a mixing pipette, attached to which is a rubber teat.

By holding the pipette perpendicularly to the watch-glass the emulsion can be alternately sucked up and forced out for five or more minutes, which action breaks up any clumps. Streptococcal growths usually require more emulsifying than staphylococcal, in order to get rid of the chains. If necessary, more salt solution may be added, but the important point is to get an emulsion of the right consistency, which is a matter of practice, and achieved by educating the eye on looking through a glass stump<sup>2</sup> containing some of the material, and seeing how translucent it is and whether of the right milky opalescence. Invariably it has to be centrifuged, and this is best done whilst in the stump, to precipitate the clumps. Afterwards the supernatant fluid is pipetted off and placed in a similar stump, which again must be scrutinised with the naked eye. If it still appears too thick, more centrifuging can be done, or more salt solution added, or both. Bacillary emulsions always appear more milky and turbid than coccal ones, in the latter the opacity is but slight. Having obtained what may be considered a good emulsion, it must now be put to the test to see whether it is so or not. In order to do this equal quantities of washed corpuscles, emulsion, and serum, in the order named are taken into a throttled pipette, separated from one another by an air space. The teat is compressed, and the contents are driven on to a clean slide. These are now thoroughly mixed with a mixing pipette, into which the mixture is finally drawn. The pipette is then sealed off and placed in the incubator or opsoniser for about fifteen minutes. The contents are then blown out on to a slide, cleaned by rubbing it gently for a few seconds with very fine emery paper, then cleaning with a duster (this

<sup>1</sup> Best grown on agar, the surface of which is spread with sterilised serum.

<sup>2</sup> A glass stump is best made by breaking a throttled pipette at its neck, then sealing off.

method is as good as using alcohol and ether). Films are now made and appropriately stained, and examined with the  $\frac{1}{2}$ th. If the emulsion is a good one, i.e., not too thick or too thin, each phagocyte ought to contain two or three bacteria.

An emulsion of tubercle bacilli is prepared somewhat differently, and is made from either a fresh culture or from dead tubercle germs, the latter being the more convenient method, as the germs are easily procurable in the form of a powder. Take a little of this powder—about half as much as can be got on to a threepenny piece—and put it into an agate mortar, and with a pestle thoroughly grind down: 1·5 per cent. salt solution is now added drop by drop to form a paste. This percentage is used, as with a smaller amount of salt the solution favours phagocytosis, producing what is known as spontaneous phagocytosis. It might be here mentioned that the same percentage is used for making emulsions of Gram-negative cocci, such as the gonococcus and *Micrococcus neoformans*—a coccus found at the edge of cancerous growths. The grinding is still continued, and a little more of the diluent is added till the paste becomes an emulsion. This part of the process takes from eight to ten minutes. Now place the emulsion in a special bulbed tube, when it can be further mixed for two or three minutes with a mixing pipette. The contents are then placed in a clean test-tube, and made up to about 4 cc. with the salt solution. The test-tube is then closed in a flame, at the same time drawing out a neck. It may now be shaken in a machine called a shaker, or else by hand, for about half an hour or more. Let it settle for a minute or two. Now break the neck, and take about 2 cc. of the clean fluid and place it in a glass stump; centrifuge three or four minutes to precipitate any clumps, and pipette off the supernatant fluid, which is put into another glass stump. Its opalescence is now tested with the naked eye. If it appears too thick, it may again be centrifuged, or else some 1·5 per cent. salt solution may be added, provided there are no clumps. Presuming now an emulsion has been obtained of the right consistency, a little can be put up with washed corpuscles and serum as was done previously; then, if found necessary, it may again be centrifuged or diluted, or both.

Having described in detail the preparation of the three essentials, it now becomes necessary to describe how these are put up, then how the smear is made, stained, and, finally, to show how the counting is done.

(1) *How to put up the Test.*—A pipette, to which is attached a rubber teat, is taken, and into it are drawn equal quantities of the washed blood corpuscles, emulsion, and serum, each occupying about an inch of the tubing, and being separated from each other by an air space. These are then put out on to a slide by compressing the teat, and then intimately mixed by alternately drawing up and expelling the mixture three or four times. When finally it is drawn up for the last time, air spaces must be carefully avoided, as they interfere with phagocytosis. The end is then

sealed off in a flame, and the pipette placed in the opsoniser for fifteen minutes.

(2) *How to make the Smear.*—Having removed the pipette from the opsoniser, nip the end of it off, and put a small drop out on to a clean slide and make a smear. The smear is best made with a special spreader, which greatly simplifies the counting. Its spreading edge ought to be sharp and very slightly concave. It can be made thus: take an ordinary glass slide and nick the middle of each of its long edges with a file. Take the slide between the forefinger and the thumb of each hand, and bend it sufficiently till it snaps across. After a few attempts a half of one of the slides will be found to possess a satisfactory shape and slightly concave edge. Nick off the corners of this edge with the assistance of a file, so that the smear when made will not occupy the whole breadth of the slide.

The smear should be equal and regular, and contain nearly all the leucocytes at its extremity. The idea of the concavity is to pass over the red cells, yet not to pass over the white cells, which it draws to the end of the smear.

(3) *How to Stain the Specimen.*—Films may be stained with Leishman in the ordinary way, or with carbol-thionin ( $\frac{1}{4}$  per cent. thionin, 1 per cent. carbolic acid) for quarter of an hour. Tubercle films should be fixed with formalin and not with perchloride, as the white cells get broken up when stained with the carbol-fuchsin. Place the film over the vapour of formalin for five seconds, then pour on boiling carbol-fuchsin and leave for ten minutes. Wash in tap-water, and then place in 2 per cent.  $H_2SO_4$  till the colour just rises, which will be in a few seconds, wash, then add 4 per cent. acetic acid for a moment, washing it off almost immediately. The acetic acid washes out the red cells, which would otherwise overstain with methylene blue, which is now added as a counterstain, for a minute or so, when it is washed off and the slide dried. This methylene blue has a strength of  $\frac{1}{2}$  per cent., to which  $\frac{1}{2}$  per cent. sodium carbonate is added.

(4) *How to Count.*—This having been touched upon at the beginning of the subject there remains but little to add. Should the number of bacteria be counted in, say, only fifty polynuclears, then the result must naturally be multiplied by 2 before dividing by 100 to get the phagocytic count, which is necessary, as I have already shown that the opsonic index is the phagocytic count of the patient divided by the phagocytic count of the pooled serum. I think the best method of counting is to enumerate the number of bacteria in five leucocytes at a time. An example will render this clear.

Number of bacteria in 100 leucocytes in series of five at a time.  
Patient:—

16	32	30	11	20	25	2	23	17	18	=	194
5	33	12	44	19	30	14	21	12	19	=	209

Total .. 403

Number of bacteria in 100 leucocytes in series of five at a time.  
Pooled serum :—

25	19	20	12	8	13	11	18	22	8	=	156
7	27	13	23	30	12	11	12	22	5	=	162

Total .. 318

Therefore  $403 \div 100 = 4.03$  phagocytic count of patient; and

$318 \div 100 = 3.18$  ,, ,, pooled sera.

Therefore  $\frac{4.03}{3.18} = 1.26 =$  opsonic index.

## PERFORATION OF DUODENUM AT SEA.

BY LIEUTENANT V. T. CARRUTHERS.

*Royal Army Medical Corps.*

SINCE it is presumably one of the functions of the Royal Army Medical Corps to treat the sick in circumstances of discomfort (*vide* Corps motto), it may not be out of place if those of us who have the misfortune to get into "tight places" in time of peace make a record of our experiences.

While on the voyage to Ceylon in a passenger-ship, a year ago, I was asked by the ship's surgeon to see with him a steward who had been taken ill while waiting at table.

The man had been suffering from indigestion for a week and had been treated with sinapisms. His condition was such that I did not think it advisable to worry him by trying to obtain a detailed history. The diagnosis seemed fairly clear from the first. He was lying on the deck racked by intense spasms of pain in the epigastrium. He complained that he could not draw his breath on account of the pain, but said he would be all right if he could have his bowels moved. His face was moist, cold and pale. The pulse was 70, regular, and of medium force. He did not vomit until the panacea (brandy) was administered by his well-meaning friends; then he vomited once or twice. The abdominal muscles were rigid, but moved slightly with respiration. The liver dulness was normal in area. It seemed plain that some catastrophe had occurred in the upper abdomen, probably a perforation of stomach or duodenum. However, as we did not have any conveniences for immediate operation, we decided to withhold morphia and wait.

At the end of two hours the patient was beginning to have the Hippocratic facies, the pain was continuous instead of spasmodic, and his pulse was quickening and becoming irregular. The diagnosis of perforation was practically certain. Another two hours passed before he would consent to operation.

Our instrument list was not long. I had only my pocket-case and some No. 4 Hagedorn needles. My colleague had the pocket-case

decreed by the Merchant Service (I believe). It contains chiefly gum-lancets, caustic-holders, directors, needle-holders and similar reminiscences of our grandfathers. We had to operate in the fore-castle, with our heads nearly touching the roof, and the thermometer (I should say) not far from 100° F. However, the sea was calm, there was excellent electric light, and abundance of sterilised salt solution, clean towels, and willing help from handy men. We also secured the services of a half-trained nurse who was travelling with a passenger. For retractors we took the company's spoons and bent them to the required shape. Of course everything about the area of operation was well boiled.

The ship's surgeon giving chloroform, I then opened the abdomen in the middle line above the umbilicus and found a small perforation in the left surface ("posterior surface") of the first part of the duodenum. At this stage the patient, who, owing to the heat, had taken the anæsthetic very badly, vomited, coughed, and strained so that a considerable mass of intestines prolapsed from the wound. When quiet had at length been more or less restored the bowel was returned coil by coil. However, the abdominal wall was still so rigid, even when it was not actively heaving, that further progress was impossible. Accordingly I was driven to paralyse one lip of the wound by severing the right rectus transversely. The perforation was then hurriedly closed with four stitches of silk. Before a second row could be inserted the patient began to vomit and struggle again, and as his general condition was far from good, the abdomen was closed after the usual "toilet." It was thought advisable to drain the region of the ulcer with two pieces of stethoscope tubing, and the pelvis was also drained through a suprapubic opening.

After-treatment was in the open air on deck, with the patient in the Fowler position on a deck chair. There is nothing special to note about his progress, except that there was some fever, due I believe to wound infection caused by our extempore and scanty dressings. The man was landed in Colombo three days later and made a good recovery.

There is not much to add by way of comment. The case was much the same as others of its class. The feeling of the patient that he will be all right if his bowels move is, I think, not uncommon in these cases. Another patient upon whom I operated for the same condition would hardly give laparotomy to be done, so convinced was he that only a purgative was needed. The difficulty in breathing is not mentioned prominently by modern authors; but I was interested to find the following passage in a thesis entitled "*De Colico Dolore*" written by one George MacFarlane in 1803. In describing the accompaniments of pain in the belly he says: "*Spiritus plerumque difficile est; et, quoties accepto in spiramenta aere pulmones ad plenum distenduntur, plurimum intenditur dolor abdominis.*"

I have not heard of the expedient of cutting the rectus being used in any other case, and it is naturally a step that one is reluctant to

take. However in this case anæsthetic troubles wasted fully an hour of invaluable time, and apparently the chloroform would not have given any appreciable relaxation if we had waited another hour.

## NOTES ON SIX CASES OF ENTERIC FEVER TREATED WITH ANTITYPHOID VACCINE.

BY CAPTAIN H. T. WILSON.

*Royal Army Medical Corps.*

It is admitted that a series of six cases is too short to justify definite conclusions, but in view of the beneficial results noticed, and the remarks by Lieutenant-Colonel Sir W. B. Leishman in Captain Smallman's former article in the *Journal*, these notes are published. Ordinary vaccine from the Royal Army Medical College was used in all cases; besides the vaccine the cases were treated on general lines as follows:—

Milk was given unless contra-indicated by the presence of curds in the stools or distension, when whey was substituted. As in enteric fever a patient has to be kept on fluid diet for a long period, I think the fluid should have the highest nutritive value possible, so as to keep up his strength for the later and more trying period of his disease. Fresh limes were used throughout the disease, at first to swab out the mouth and keep it clean, later in the form of lime juice, thus counteracting any tendency to sponginess of the gums, and the increased coagulability of the blood which occurs later in the disease.

Alcoholic stimulants were not given, as at the Temperance Hospital, London, where alcohol is only used in special cases when the occasion demands, and not as a routine, the freedom from delirium of the cases noticed there was very marked.

The following mixture was given three times a day till convalescence:—

Bismuth salicylate	..	..	..	..	..	gr. xxx.
Sodii bicarb.	..	..	..	..	..	gr. x.
Calcium chloride	..	..	..	..	..	gr. x.
Mucilage	..	..	..	..	..	℥ss.
Aqua menth pip. ad.	..	..	..	..	..	℥i.

The calcium chloride was omitted as soon as the temperature dropped. During convalescence urotropine and sanatogen were used, and any other tonic that might be required.

The cases were undoubtedly enteric fever, having all the signs and symptoms, together with the typical enteric spots. \*

Case No. 2 had been inoculated against enteric three times, once within the last year, and his serum was tested for a reaction with paratyphoid bacilli, but with a negative result.

Case No. 3 stated "he had been inoculated once," but seemed very doubtful on the point, and no entry to this effect could be found in his medical history sheet. The remainder had not been inoculated.

A motile bacillus resembling the enteric bacillus was obtained in each case from an ordinary broth culture made from the blood taken from the median basilic vein, but no confirmation could be made owing to there being no facilities at Barian for culture in Conradi's bile medium and plating out.

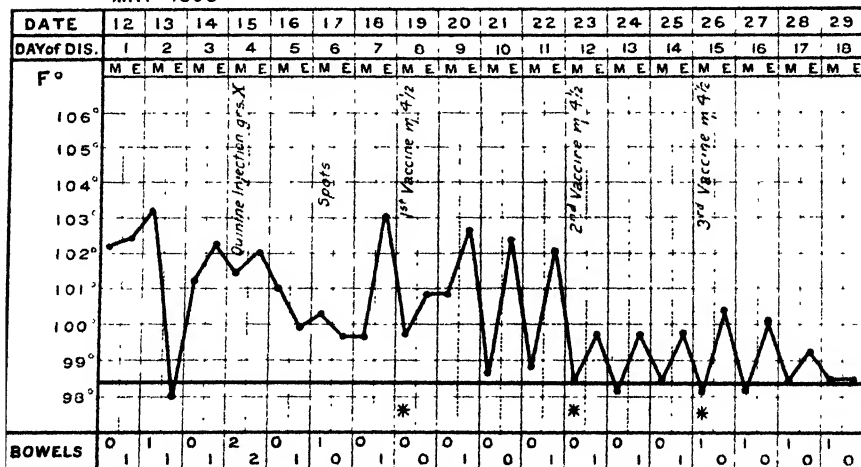
Widal's reaction was positive in all cases, except No. 3, in which it was negative. The injections of vaccine were given in the ordinary way into the subcutaneous tissue of the arm, in the region of the deltoid. Very little discomfort was caused, perhaps due to the men being treated with calcium chloride at the time. The cases showed little or no temperature of local reaction, in fact the temperature in the majority of cases was at a very much lower level on the day after injection. Taking 1 cc. of Royal Army Medical College vaccine to contain approximately 1,000,000,000 bacteria, the initial dose given was  $4\frac{1}{2}$  ml, or approximately 250,000,000 bacteria. This dose was chosen as the cases were mild at the onset with no symptoms of excess of toxins. The same dose was continued in case No. 1, but in cases No. 3 and No. 4 it was increased to 9 ml and 6 ml respectively, with good results as shown by the condition and temperature of the patient.

In determining the dosage and time to give the injection, I was guided chiefly by the general condition and temperature of the patient; if he did not seem to be progressing towards convalescence but was at a standstill, his general condition being good, he was given another injection of slightly increased quantity; but if his general condition had not improved, the same or a smaller dose was given.

All the cases progressed favourably and made a rapid convalescence and showed no tendency to relapse. Below are the temperature charts, with notes bearing on each particular case.

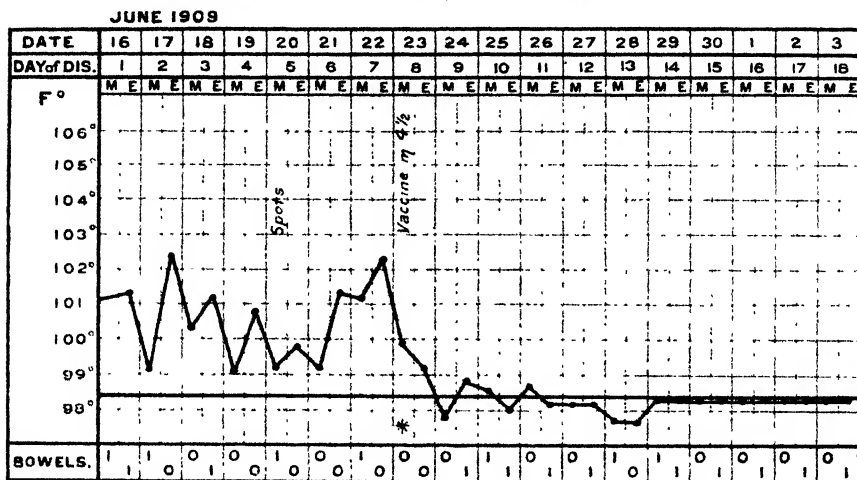
CASE NO. 1.—Date of admission, May 12th, 1909. Duration of fever, seventeen days.

MAY 1909



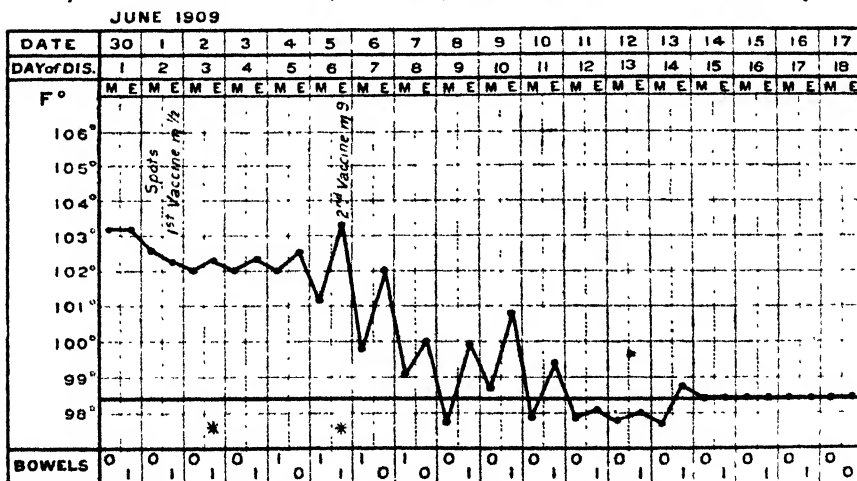
Case No. 1 suffered a good deal from constipation, which was relieved by small glycerine enemata. He had a remarkably good appearance and was free from any restlessness.

CASE No. 2.—Date of admission, June 16th, 1909. Duration of fever, eleven days.



Case No. 2 was a mild attack; he had been inoculated three times, once in the previous year; his reaction to paratyphoid was negative; he had numerous typical enteric spots. His condition and temperature improved at once after the first injection without any temperature of reaction.

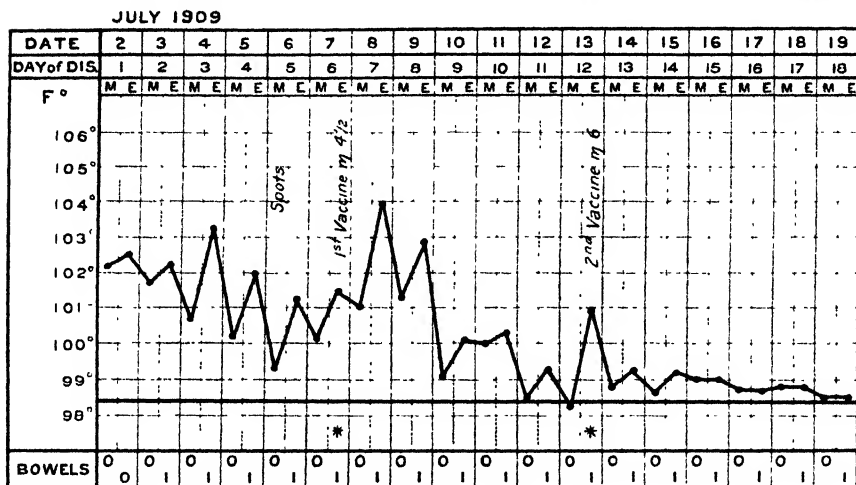
CASE No. 3.—Date of admission, June 29th, 1909. Duration of fever, fifteen days.



Case No. 3 had a high continuous temperature at first and was inclined to be delirious. The first dose of vaccine made the patient much less restless, and the second improved his condition immensely.

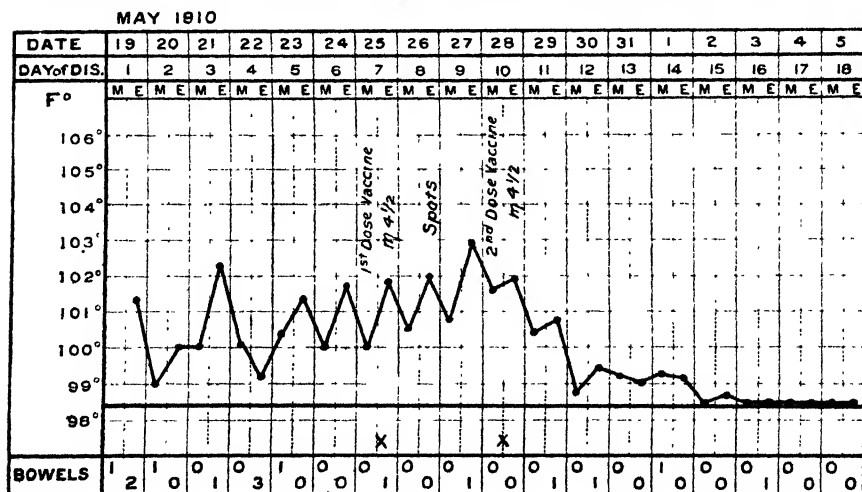
This patient also suffered from syphilis contracted nine months previously, and was accordingly treated with pulv. hydrarg. c. crete.

CASE No. 4.—Date of admission, July 3rd, 1909. Duration of fever, fifteen days.

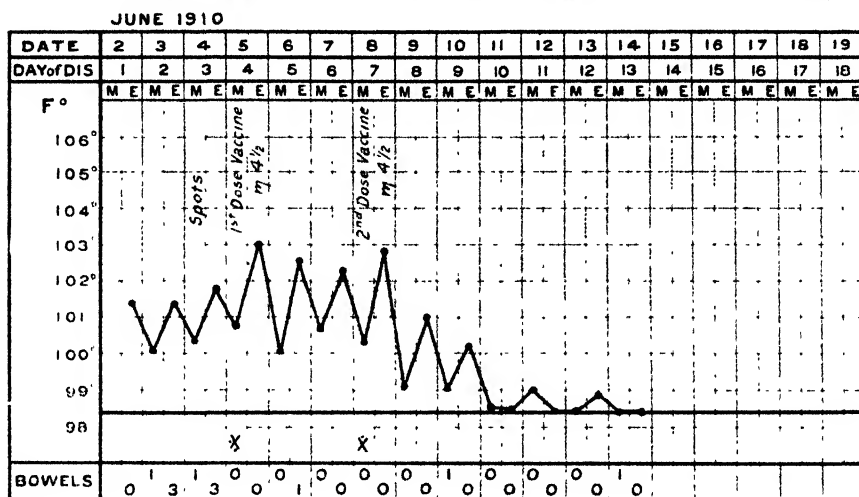


Case No. 4 was a schoolmaster who had an aversion to milk and so was given albumin water, meat juice, and soup. He complained a good deal of sleeplessness and was very anxious about his wife, who was admitted to the family hospital soon after his admission to the Station hospital. The sleeplessness and anxiety vanished with the first injection, and he stated "he felt ever so much more comfortable and restful after it," even though his temperature rose to 104° F.

CASE No. 5.—Date of admission, May 21st, 1910. Duration of fever, fifteen days.



CASE No. 6.—Date of admission, June 3rd, 1910. Duration of fever, fourteen days.



In conclusion, the point that struck me most was the absolute difference in appearance of the cases of enteric treated with vaccine to other cases I have seen; they all looked so much fresher and more robust, with no anxious appearance, and all volunteered the information that they felt decidedly more comfortable after the injection.

The output of urine was not measured and no marked increase or decrease was noted.

By CAPTAIN M. W. FALKNER.  
*Royal Army Medical Corps.*

Patient was seen at 3.30 p.m., and presented the following symptoms and physical signs: Severe and continuous pain in the umbilical region; difficulty in breathing, which was thoracic in character; face pale and

drawn; no mark on the surface, although he stated that he received the full force of the kick in "the pit of the stomach"; pulse 120 and feeble in character; abdomen moderately distended and very rigid; liver dullness not apparent on percussion; no vomiting; normal urine passed through a catheter. A diagnosis of rupture of some hollow viscus was made, and from the history it was thought this was situated in the epigastric region. Morphia  $\frac{1}{4}$  grain hypodermically was now given, and preparations were made for operation. Owing to the theatre being under repair the operation was not commenced till 7.30 p.m.

*Operation.*—After the usual surface preparation, the abdomen was opened by a vertical incision 1 inch to the left of the middle line, and extending from the lower end of the sternum to just above the umbilicus. On retracting and pressing back the omentum a fair quantity of blood-stained fluid was seen in the region of the liver and hepatic flexure of the colon. The anterior surface of the stomach was normal, and the organ moderately distended. The gall-bladder was seen to be uninjured. The peritoneum between the stomach and transverse colon was divided vertically and retracted. The posterior surface of the stomach, duodenum, pancreas, spleen, and liver were now seen to be normal. The hand was passed round the convex upper surface of the liver to see if that organ was ruptured, because a fair quantity of blood was seen and after mopping this up as much as possible it seemed to come from behind the posterior border of the liver. After a negative search in this region, the peritoneum between the stomach and colon was sutured with fine catgut. Next the transverse colon and large omentum were turned off the upper part of the wound into hot abdominal cloths. On examination of the small intestine a transverse rent was discovered about the centre of the jejunum. This extended across the bowel, except a small strand opposite the mesenteric attachment. The rent extended through the mesentery back to the spine, thus explaining the origin of the hæmorrhage seen in the first part of the operation. Several hæmatomata were seen in the mesentery, but fortunately these were small and not likely to interfere with the attached segments of bowel. A large-sized Mayo-Robson's bobbin was inserted into the torn bowel, and the latter sutured over it with fine catgut, taking up all the coats of the bowel. Next a continuous Lembert suture, sero-muscular, of fine silk was inserted outside the line of the catgut sutures. The torn mesentery was repaired with a continuous catgut suture, as there was no visible extravasation of intestinal contents, the immediate vicinity of the rupture was sponged with swabs soaked in hot normal saline. It was now considered advisable to surround the part of the bowel containing the bobbin with a thin layer of gauze, the ends being brought out of the lower extremity of the wound. This procedure was specially indicated in this case, as there was a certain amount of contusion of the bowel in the vicinity of the rupture, and the peritoneal cavity would be thus shut off after twenty-four hours, and if

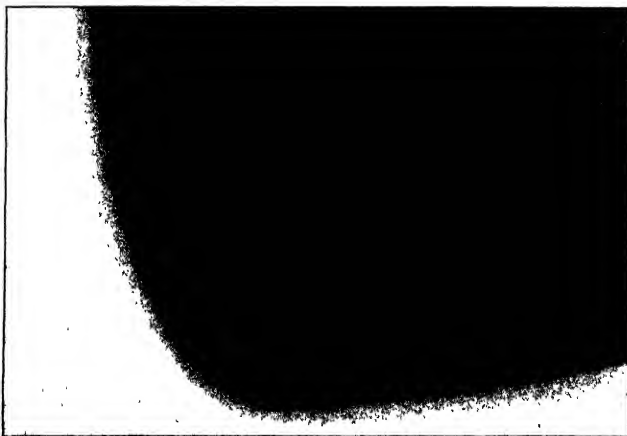




View of elbow joint from outer side after accident.



Photo of the fragments removed.



Skiagram taken after operation.

To illustrate "Fracture of the Upper End of the Radius through Indirect Violence." By Captain J. B. CLARKE, R.A.M.C.

leakage occurred the worst would be a faecal fistula. The upper portion of the wound was closed by silkworm gut, taking up all the layers of the abdominal wall. All known precautions were taken to overcome shock before, during, and after the operation.

*After-treatment.*—The patient's condition was so bad after the operation that he was left for thirty-six hours in the operation theatre, which was heated up to 70° F. When he recovered from the anæsthetic he was placed in the Fowler position. The gauze was removed from the lower portion of the wound in thirty-six hours, as it was no longer required, and was causing a little pain and sickness from irritation of the peritoneum. At the same time the remaining portion of the wound was closed. There are no other points of interest except that a faecal fistula formed on the fifth day, but this closed in a few days under the usual treatment. The patient was discharged on two months' sick furlough on March 10th, completely recovered.

*Special Points.*—There was no sign of injury on the surface of the abdominal wall, which points to the fact that the muscles did not get time to contract and take some of the force of the kick. From the appearance of the injury to the bowel and mesentery it is probable that they were caught between the horse's hoof and the vertebræ. The patient was positive he was kicked just under his sternum, and yet the injured part was found at the umbilicus. After receiving the injury he walked from the stables upstairs to his barrack-room. The ruptured segment was protected by spasm of the segment above it.

## FRACTURE OF THE UPPER END OF THE RADIUS THROUGH INDIRECT VIOLENCE.

By CAPTAIN J. B. CLARKE.

*Royal Army Medical Corps.*

On July 13th, 1909, Lance-Corporal J. W., 2nd Battalion the Royal Scots, was admitted to the Military Hospital, Edinburgh, suffering from an injury to his left elbow.

On the previous afternoon he was vaulting a fence when his foot caught in the top rail and he fell forward on to his extended left hand. He immediately felt a sharp pain in his left elbow-joint, which began to swell rapidly.

On examination the joint was too swollen to make much out, and the slightest movement caused much pain. The relation of the bony points did not appear to be disturbed.

On June 17th the limb was skiagraphed. The screen showed nothing, owing to the density of the parts. The skiagraphs revealed an oblique fracture of the upper end of the radius, extending from just above the bicipital tubercle, downwards and backwards; it was situated below the

orbicular ligament and above the oblique ligament. There was a separation of about  $\frac{1}{4}$  inch between the fragments, the upper showing comminution.

As the injury is of such rare occurrence, I took the patient to Professor Caird at the Edinburgh Royal Infirmary, who kindly examined the case and the skiagrams. He recommended that an attempt be made to wire the fragments, but, should it be impossible to get them into good apposition, the removal of the upper fragment would offer the best chance of obtaining a useful limb.

On June 22nd, assisted by Captain E. G. French, and with Lieutenant Pottinger giving the anæsthetic, I cut down on the head of the radius from behind, through the supinator brevis muscle. The comminution of the upper fragment was much more extensive than was shown by the skiagram. The head of the radius was split and the neck broken into several pieces, the line of fracture running obliquely from below the bicipital tubercle. The orbicular ligament was ruptured. The insertion of the biceps tendon into the tubercle remained intact.

As wiring was out of the question, the upper fragments were removed. A gauze drain was inserted and the wound sutured. The wound healed by first intention, the stitches being removed on July 3rd. Passive movement and massage were commenced as early as possible.

Flexion and extension have almost entirely been regained, and pronation and supination to about two-thirds of the normal range.

On July 30th the patient (without my knowledge) lifted a 56 lb. weight with his affected arm.

He was discharged to duty on August 12th.

The second skiagram shows the condition of the joint after the operation.

## ENTERIC FEVER IN KIRKEE IN 1909.

BY CAPTAIN C. SCALFE.

*Royal Army Medical Corps.*

TWENTY-SEVEN cases of enteric fever occurred in Kirkee during 1909, and as the average number for the last six years was twelve (including 30 cases in 1904), this might be considered to be a slight epidemic in these days of improved sanitary conditions in India.

Inoculation was strongly advocated both before and during the epidemic, and in view of this it was thought that a statistical account might possibly be of some interest.

The average annual strength of British troops in Kirkee for the year 1909 was 877, and consisted of one brigade R.F.A., and a detachment of Infantry, which was relieved at the end of every quarter.

Owing to this quarterly change in the British Infantry, and also to the monthly increase in the number of inoculations done, the percentages

of the inoculated and the non-inoculated had to be made out every month, and an average struck for the year. This in itself, though not absolutely accurate, is sufficiently so for all practical purposes.

The average annual number of N.C.O.'s and men inoculated was 45 per cent., of non-inoculated 55 per cent. Twenty-three cases of enteric occurred amongst the non-inoculated, with three deaths, and four cases amongst the inoculated with no death. Three cases are reckoned among the non-inoculated because they only received one dose each, and that four, six and seven days respectively before admission to hospital. These three men, in all probability, were infected before the inoculation took place. As regards the protection from infection, in this epidemic it works out at something over  $4\frac{1}{2}$  to 1. The average duration of the fever in both inoculated and non-inoculated was twenty-four days.

Average annual percentage	Number of cases	Duration of fever	Number of deaths
Inoculated 45 per cent. . . .	4	24	Nil
Non-inoculated 55 per cent. . .	23	24	3

Protection of inoculated from infection  $4\frac{1}{2}$  to 1. Positive "Widals" were obtained in all cases.

The epidemic was one of average severity, most of the cases developing the group of symptoms known as "the typhoid state." Complications were of fairly frequent occurrence.

The four cases in the inoculated were in distinct contrast to those in the non-inoculated. Their appearance was never typical of enteric, the "typhoid state" was never present, their intellects remained clear enough for them to read and take an interest in their surroundings, and none of them felt really ill during the course of the disease. One of them had a slight hæmorrhage, but this did not in the least affect him or his subsequent progress. The conclusions to be drawn from this epidemic, are the high ratio of protection from infection, and a distinct modification of the symptoms, in the inoculated.

As regards the operation of inoculation, some slight modifications were adopted. Instead of the small inoculation syringe being used, one capable of holding 20 cc. was substituted, which was found to accelerate the operation very considerably. The use of boiling oil, except for the primary sterilisation of the syringe, was discontinued. The needle, between each inoculation, was sterilised by passing it through a flame and then cooled in cold sterilised water. The spluttering of boiling oil (caused by dipping a moist needle into the oil) which is unpleasant for the operator and those in the vicinity, was thus done away with, and proved satisfactory in a series of 700 cases.

The unit which we had to deal with had fewer men inoculated than any in India. At the beginning of 1909 they had only 19 per cent. of

their strength inoculated, and at the end of 1909, 53 per cent. Lectures were given by various medical officers, and the men who refused were spoken to personally. Not until one or two deaths occurred did they come up in any great numbers, and even then there were a lot of "fatalists" who absolutely refused to be inoculated. Considering the diminished liability to infection, the much decreased mortality, and the modification of the disease, is it not now time for compulsory inoculation?

## THE CONTINUOUS TREATMENT OF SYPHILIS.

By MAJOR F. J. W. PORTER, D.S.O.

*Royal Army Medical Corps.*

AN inspection of syphilis case-sheets reveals in a very large number of cases the fact that many of our officers who give mercury by the mouth are doing so in a very intermittent manner—"No symptoms, no treatment," is a frequent entry.

It is generally accepted that two years' *continuous* treatment is necessary for the cure of this disease, and if intervals of two, three, or four months without treatment occur, it is very difficult to see how the soldier is obtaining what is considered, both by the leaders of the profession and the medical regulations, necessary for his recovery.

The whole question of intervals in the administration of mercury appears to me to depend entirely on how long it takes, when given by the various methods in vogue, to become entirely eliminated from the body.

When Colonel Lambkin introduced the method of intramuscular injections of grey oil into the Service, it was felt that one great advantage over dosage by the mouth consisted in the fact that several foci of mercury were introduced which took a considerable time for absorption, also, that so long as they existed the patient was daily receiving minute quantities of the necessary drug. At first it was uncertain how much of the drug should be introduced, and there is no doubt that cases of poisoning from over-dosage occurred. Of late years it has been the custom to give courses of injections with intervals.

Dr. R. W. Mackenna, of Liverpool, has conducted extensive investigations on the relative rate of elimination of mercury in the urine when administered orally, intramuscularly, and by inunction.

He is shortly publishing his results, but in response to my request he has very kindly allowed me to make use of his work, and for the purposes of this paper, I cannot do better than quote his letter:—

"(1) Female: received liq. hydrarg. perchlor. (B.P.) in doses of 1 drachm, thrice daily for three months. In that time she received the equivalent of 9·3 grains of mercury, and one week after last dose I failed to find any trace of mercury in the urine.

"(2) A man received 4 grains of hyd. c. creta by the mouth daily for

three months, receiving in that time the equivalent of 121 grains of mercury. Fourteen days after last dose I failed to find any trace in his urine.

"(3) A man received 1 drachm of liq. hyd. perchlor., thrice daily for a month. In that time he received the equivalent of 3·5 grains of metallic mercury. Less than a week after last dose I failed to find any trace in his urine.

"In patients treated by inunction at Aachen and elsewhere, I have never been able to find mercury in the urine three months after the completion of their course; while, in patients who have had intramuscular injections—a full course—it is quite common to find definite traces of mercury in the urine two and even three months after the course is over. A good deal depends on the man's metabolism, and I have done some work to prove that there is a definite relationship between the rate of mercury elimination and the metabolic activity as evidenced by the urea elimination, and the functional activity of the kidneys as evidenced by the chloride elimination."

In the *British Medical Journal* of May 8th, Sir Jonathan Hutchinson writes: "Why are interrupted courses recommended in preference to continuous ones?"

It is suggested that the idea is to give the constitution "periods of rest."

Now I must contend that, with rare exceptions, if the course be well managed, there is not the slightest need for periods of rest. A two years' course, begun at the earliest possible date and pursued without any intermission whatever, is, I feel convinced, the safest plan. The farmer is accustomed to give his grazing land intervals of rest by driving his flocks elsewhere for a time. His object is, however, to let the grass have a chance of growing. Do we not, in the treatment of early syphilis, effect much the same end in favour of the spirochæte by periods of "rest from mercury"? I can think of no motive for intermittent courses other than the sportsmanlike instinct not to hit a man when he is down, whereas our object clearly should be to kill utterly.

## Lecture.

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### LINES OF COMMUNICATION.

#### WITH SPECIAL REFERENCE TO THE MEDICAL SERVICES.

*A Lecture given at Edinburgh on January 20th, 1910, by Captain A. W. Tufnell, attached to the General Staff, Scottish Command, in accordance with Royal Army Medical Corps Training, Part III. (Military Training), paragraph 16.*

#### SYLLABUS OF LECTURE.

##### PART I.—GENERAL.

References to Previous Lectures—General Remarks on the Lines of Communication—Definition—Some examples from History—Extent of the Line—General Principles—Command—General Functions—Organisation—Separation of Administration and Defence.

##### PART II.—ADMINISTRATIVE ORGANISATION AND FUNCTIONS.

General Sketch of Administrative Arrangements—Inspector-General of Communications—Directors and Heads of Administrative Services—Administrative Commandants—Base Commandant—Section Commandants—Railway Control Officer—Post Commandants—Commandant of the Advanced Base—Supplies—Ordnance Stores—Transport—System of Convoys—Mechanical Transport—Remounts—Veterinary Hospitals.

##### PART III.—DEFENCE.

Commander of Lines of Communication Defences—Section and Post Commandants—Armoured Trains—Methods of Defence—Piquets and Escorts—Relations of Administrative and Defence Troops.

##### PART IV.—THE MEDICAL SERVICE.

Importance of Medical Officers having a knowledge of Military Operations—Evacuation of Sick and Wounded—Sanitary Districts—Sanitary Officers, Sections and Squads—Collecting Zone—Evacuating Zone—Distributing Zone—Clearing Hospitals—Ambulance Trains—Stationary Hospitals—General Hospitals—Convalescent Depots—Final Disposal of the Sick and Wounded.

##### LIST OF DIAGRAMS.

- (1) Kamiesch Bay, in the Crimea.
- (2) An Example of a Line of Communication.
- (3) A Typical Post on the Lines of Communication.
- (4) System of Supply.
- (5) Chain of Medical Arrangements.

##### PART I.—GENERAL.

##### GENERAL REMARKS ON THE LINES OF COMMUNICATION.

This lecture will consist, as it must consist, very largely of repetition and quotation from the Manuals. These Manuals have been very recently

compiled, they treat their subjects exhaustively, and it is difficult to see how they can be improved upon ; but my object has been to extract from them so much of the essentials as can be compressed into the time available, omitting all unnecessary detail.

In the first of this series of lectures Colonel Hunter-Weston reviewed the system of organisation of an army in the field, and laid stress on the fact that the Division, being the smallest formation in which all the various Arms are represented, must be accepted as the basis of our Army Organisation. He pointed out the objects and functions of the several components, and explained how the various pieces fit into the puzzle, each in its proper place, and each within its respective sphere of usefulness.

In the second lecture Major Ross explained how the pieces are made to move in conformity with the will of the supreme commander, reviewing the different ways and means by which the necessary orders are conveyed to them ; and he led up to the particular subject-matter which we are endeavouring to understand—namely, the relation of the Medical Service—pointing out how important it is that Medical Officers should acquire some knowledge of the art of war, in order that they may render that assistance which is essential for success, by treating and evacuating the wounded from the field of battle. To-day we have to go further and see how the sick and wounded are to be disposed of afterwards. Near the commencement of his lecture, Major Ross asked you to imagine yourselves with the Division, which was preparing itself to best the enemy, after having passed from the base to the advanced base by means of the lines of communication. Now what are the lines of communication ? Of what do they consist, and what are their general and special formation functions ?

*"The systems of communication between the army and its base, or bases of operations, inclusive, together with the district through which they pass, within such limits as the Commander-in-Chief may determine"* ("Field Service Regulations II.," p. 16). That is the definition of the lines of communication, as given in the Field Service Regulations ; in the Field Service Pocket Book they are more concisely described as *"the lines by which an army communicates with its base"* ("Field Service Pocket Book," p. 10). And these lines or systems may consist of any one or more of the following : Railways, roads, canals, navigable rivers, telegraph and telephone wires, or the arrangements made for visual signalling.

The more an army can subsist on the country, the less, of course, will be the strain on the lines of communication ; but in Continental warfare armies must necessarily be large, and in uncivilised countries supplies are not found in great quantities ; and Prince Bülow, in his book entitled *"The Spirit of the System of Modern War,"* stated that modern armies are entirely dependent upon their magazines. That book was written as

early as the beginning of the last century ; but nothing has, to my knowledge, happened since to qualify his statement. And no general was more careful in accumulating supplies or in protecting his communications than Napoleon. As an instance, after Jena, when in a single day he had shattered the power of Prussia, his very first act was to establish with France a fresh and shorter line of communication (*diagram illustrating the Jena campaign shown and explained*). I don't mean to contend that the Emperor was infallible ; for a well-known exception exists, which I shall mention presently.

Perhaps there is no more difficult and uncomfortable situation than that which a general has to face when his communications have been severed and contact with the enemy is imminent. The necessity for feeding his troops calls upon him to scatter them for purposes of subsistence, while the tactical situation demands their concentration. This shows how important it is that the commander in the field should be freed as far as possible from the responsibility of safeguarding his communications, and how much may depend upon the capacity of the subordinate to whom their safety is entrusted.

It is common knowledge how the course of a campaign is influenced by the rapidity with which mobilization is carried out, the concentration of troops is effected, and the lines of communication are organised. Their formation must keep pace with the advance of the field army ; an instance of the neglect of this principle and its results is furnished by Napoleon's campaign in Russia in 1812. The army moved on Moscow too rapidly, with the result that, when Napoleon was compelled to retreat, his Grand Army was starved and practically ceased to exist, the losses amounting to something like 400,000 men.

The importance of *retaining* the lines of communication is exemplified by the 1870 campaign, when the Germans circled completely round the French army at Metz and severed its communications with Paris. The loss of the communications practically decided the campaign.

It is an axiom that the lines of communication should be as short and direct as possible ; but this principle is, of necessity, qualified by the following considerations :—

Firstly, geographical. For instance, in the Soudan a force would naturally take the longer route, landing in the North, and utilising the Nile, unless a port existed on the Red Sea which would fulfil requirements.

Secondly, political, such as the necessity of guarding certain towns or localities.

Thirdly, mechanical—that is to say, a longer route would be justified by the favourable situation of railways. A fairly good instance of the last two conditions combined can be taken from the Natal campaign in 1900.

The old road from Ladysmith to Newcastle lay directly over the Biggersberg, but this was not utilised. Instead General Buller's communications made an easterly detour, passing through Glencoe and Dundee, and making use of the railway (*sketch of Northern Natal shown and explained*).

A good instance of a short and convenient line is that adopted by the French in the Crimea (*shown in Diagram I.*). From the harbour of Kamiesch a road was made traversing the rear of the French camps. You can see at a glance how convenient a system of supply it was; but had the army been obliged to change front, the advantage would, of course, have disappeared.

Before reviewing the lines-of-communication system in civilised campaigns, it would be a mistake not to make some mention of the conditions attached to savage and irregular warfare, which are considerably different. In this type of fighting it is acknowledged by Callwell, who is one of the best authorities, that the strategical advantage at any rate lies with the enemy, from the freedom which he enjoys from any anxiety as to his base or his line of supply. Regular troops are faced with the two alternatives of either utilising a large percentage of their numbers to maintain the communications, or of cutting themselves adrift from them altogether.

If the former alternative is adopted, the drain upon their resources is considerable; for the line is often very extended, the temper of the population is intensely hostile, and the convoys are incessantly exposed to attack. In the Abyssinian campaign, which I will refer to again later on, the distance from the base on the Red Sea to Magdala, the capital, was 380 miles. In the Afghan campaign, when the field force consisted of 12,000 men, the troops required for the efficient protection of the line between Peshawar and Kabul exceeded 15,000.

If the other alternative is taken, and the field force takes upon itself for the time being the form of a flying column, the length of the supply train—considerably aggravated by the fact that it is composed of pack transport—and the burden of the sick and wounded are liable to become a millstone round the neck of the commander. It is just a gamble, with a good deal more than money hanging in the balance. Victory means that the natives will vie with each other to dispose of the country's products; disaster, except in an exceptionally productive country, brings possible starvation, with a population merely waiting a favourable opportunity to rise *en masse* and harass the invader to extermination. Examples of success are Sir Donald Stewart's six weeks' march from Kabul to Kandahar, and Sir William Lockhart's return from Tirah down the Bara Valley; but in the last case we had the advantage of moving towards our own country, confident of finding supplies awaiting us. An instance of failure is the disastrous retreat from Kabul in 1844.

Great Britain has, during the nineteenth century, adopted a scheme of colonisation which can only be described as vast in comparison with the

enterprises of other Powers; and with this extraordinary expansion of the sphere of imperial influence have come, as a matter of course, increased responsibilities. And this has affected the Army as much as, or more than, any other part of the British nation; I think I am right in saying it has affected the Army even more than the Navy; for, whereas the Powers with whom we may have to contest naval supremacy may be easily counted on the fingers of the hand, the Army has to be designed and trained to wage war against practically every sort of foe, and in every variety of climate. Consequently, as stated in the Field Service Regulations, it is impossible to design for it a system of organisation applicable, without modification, to every campaign (*F.S. Regns., II., 7(3)*). This point is again alluded to in the Memorandum on Army Training, 1909, recently issued, and also in para. 2 of the Notes on the Expeditionary Force in War Establishments, 1909-10.

What applies to war organisation generally applies equally to the control and working of lines of communication; and as an initial step we must understand that there can be no sealed pattern for universal use. But the authorities go so far as to lay down certain general principles—not rules—which are capable of modification to meet the needs of each particular case; and it is our duty to make ourselves thoroughly acquainted with these principles.

#### COMMAND.

Now the first important question which arises is this: Who is the official who is to initiate and co-ordinate all that is necessary for the smooth working of the lines of communication? There is no single individual; but the chain of responsibility is clearly and definitely traced in the "Field Service Regulations," Part II., and I will ask you to follow it step by step, because of its importance.

Turn to Section 2, para. 2: "*A state of war is declared by Royal Proclamation.*" And in the following paragraph: "*The Army Council, on the authority of His Majesty's Government, issue the order for Mobilization.*"

Turn to Section 5, para. 1: "*The Commander-in-Chief of the Forces in the Field is appointed by the Government.*"

Turn to Section 6, para. 3: "*The plan of operations is drawn up by the Chief of the General Staff (i.e., at the War Office) and submitted for the approval of the Government.*" Such approval is clearly necessary, not only because strategy must always to some extent be dependent upon politics, but also because only the Government can vote the necessary money for maintaining in the field such forces as are necessary for the execution of the plan. And, continuing the same paragraph, "*Responsibility for the execution of the plan lies with the Commander-in-Chief, subject to such orders as he may from time to time receive from the Secretary of State for War.*"

Now turn to Section 25, para. 1: "*The general direction and extent of the lines of communication are determined by the plan of operations,*" for which, as I have already explained, the Government assumes responsibility when its approval is given. We see, then, that the general direction and extent of the lines of communication are actually determined by the Chief of the General Staff when he draws up the plan of operations, and it is only the details which are left to be settled under the orders of the Commander-in-Chief. These details have to be worked out by his Staff and the Inspector-General of Communications.

#### GENERAL FUNCTIONS.

The definition which I quoted explains so clearly of what the lines of communication consist in general terms that it only remains to consider what their functions are, how they are subdivided, and what troops are to be employed. Their functions are:—

To provide a safe route by which reinforcements may proceed, and a host of things necessary for its maintenance in a state of fighting efficiency may be forwarded to the army in the field. Among the things necessary may be mentioned, as some of the most important, arms, ammunition, equipment, horse-shoes, food, clothing, medical and veterinary stores, and cash for the payment of the troops.

Conversely, to arrange for transit from the field army to the base of sick and wounded, prisoners of war, and sometimes of booty captured from the enemy.

A few calculations which I have worked out from War Establishments will assist you to realise the number of troops and amount of material which have to be dealt with. First, as to men: the wastage of war is, of course, calculated differently for the various arms, but in the notes on the Expeditionary Force we are told that the average is fixed at 70 per cent. of the army in the field during the first year of a campaign (*War Establishments*, 1909-10, p. 3, para. 17). In that period, therefore, on that rough basis, the number of men who will be passed along the line for a single division is, roughly, 14,000 men, to maintain the formation at full strength.

To feed the same force the weight of supplies and forage which will have to pass along the line daily is represented by about 110 tons, and requires for its transport eighty-five G. S. wagons. A further calculation of road space shows that the convoy will occupy over three-quarters of a mile of road. This is on the assumption that forage has to be provided for all the horses; if grazing is available, twenty-nine of these wagons can be dispensed with.

The gun ammunition to be maintained on the lines of communication as a reserve for a single division weighs 376 tons; and this allows nothing for rifle or machine-gun ammunition, the reserve supply for which has not yet been decided. But although the reserve for these has

not yet been fixed, we may assume that it will be calculated more or less on the same lines as for the Artillery, viz., that the reserve on the lines of communication will approximate what accompanies the field units. On this basis the reserve of rifle ammunition will weigh, roughly, 800 tons, and that for machine guns about 105 tons, making a grand total of 1,281 tons which has to be kept always available to pass to the front. These few facts are quite sufficient to show the enormous amount of stuff which has to be handled.

As in every other part of army organisation, decentralisation is the secret of smooth working, and we must next see whether we understand how the necessary decentralisation is provided for. The functions which I have just enumerated may be more briefly described as:—

Firstly—administration and traffic control.

Secondly—defence.

In the Field Service Regulations they are mentioned in the opposite order, but I place them in this way as being the more logical sequence for the purposes of a discussion; for, unless the traffic had to be provided for, the necessity for safeguarding the line would not exist.

#### ORGANISATION.

When in a friendly country, or when the line is short, responsibility for security, as well as for the administration and control of the traffic, is usually vested in one commander, styled the Inspector-General of Communications, abbreviated in the Regulations as the I.G.C. (*F.S. Regns. II. 12 [2]*). But when in a hostile area, or when the line extends over a long tract of country, the administration and traffic control are in the hands of the I.G.C., while the defence is entrusted to a separate independent officer, styled the Commander of the L. of C. Defences (*F.S. Regns. II. [2]*). The latter is responsible only to the Commander-in-Chief, and reports direct to the Chief of the General Staff in the field. This matter is a reversion of the ordinarily accepted proverb that "You must cut your coat according to your cloth." In a matter of such importance as this, you must buy enough cloth for the clothes required; or, in plain English, the Commanders, staff, and troops must be sufficient to cope with the needs of the particular circumstances.

For purposes of this lecture I propose to take the more complicated case, where the circumstances are such as to warrant the division of the administrative and fighting troops under separate commanders. If the working rules in such a case are understood, it will be an easy enough matter to realise the more simple alternative, where the responsibilities for administration and defence are centred in one commander only. I will also assume that one line only is to be used. In some cases there may be two or more alternative lines; but this will be the exception rather than the rule, for obvious reasons. When more than one line is used, it is at the discretion of the Commander-in-Chief whether separate inspector-

generals are to be appointed for each, or whether all the lines are to be controlled by the same commander.

## PART II.—ADMINISTRATIVE ORGANISATION AND FUNCTIONS.

In diagram 2, which hangs before you, there is nothing subtle or original; it is merely a reproduction of the two plates which face pages 27 and 152 in the Field Service Pocket Book. It shows a normal line of communication, with road posts 10 miles apart, and 25 miles between railway posts; the latter may, of course, often be considerably farther separated. It illustrates the division of the line into sections, and shows how the base and advanced base are independent of the sectional organisation. As the lecture is continued, it will serve to enable you to see where the various depôts referred to are located, and to follow generally the system of supply.

### INSPECTOR-GENERAL OF COMMUNICATIONS.

The Inspector-General of Communications is responsible for:—

The organisation of the line, including the base and the advanced base.

Co-ordination of all the administrative services.

Maintenance and forwarding of reinforcements, remounts, supplies and material.

Evacuation of sick and wounded.

Supply and accommodation of all troops quartered on, or moving along, the line.

Selection of sites for depôts and hospitals.

Repair of roads, railways, and bridges.

Civil administration.

The safe custody of prisoners of war.

He must report daily to the Commander-in-Chief's staff the quantities of supplies, stores, and ammunition on the line. He is authorised to deal direct with the Secretary of State for War on questions connected with the supply and maintenance of the army in the field. Another most important duty which falls to his lot is to have plans cut and dried for the rapid withdrawal of the army from the theatre of war, and for its transportation home, when hostilities terminate. A state of readiness for this contingency will save the country a very large sum.

### DIRECTORS AND HEADS OF ADMINISTRATIVE SERVICES.

At the discretion of the Commander-in-Chief, Directors and Heads of Administrative Services may either accompany him in the field or be attached to the Staff of the I.G.C. (*F.S. Regns. II. 23 (7)*). But, as a general rule, the directors of railways, works, remounts, veterinary services, ordnance and postal services will be located on the lines of communication, while the directors of army signals, medical services,

supplies and transport will accompany general headquarters. It is purely a question of under which conditions each can best fulfil his duties, so as to further the plan of operations. I will not waste time by enumerating the various duties of all these directors; they are given very fully in the Field Service Regulations (*F.S. Regns. II. 24*).

#### ADMINISTRATIVE COMMANDANTS.

Under the I.G.C. are the administrative commandants, one of whom is appointed for the base, one for the advanced base, and one for each section into which the line is divided (*F.S. Regns. II. 13*).

#### BASE COMMANDANT.

The Base Commandant is responsible for discipline, sanitation, and interior economy at the base, the reception and despatch of troops, remounts, stores, and material, the report of all movements to the I.C.G., and to Section Commandants, and for close co-operation with the Naval Authorities. In the latter particular, a Military Landing Officer will act as the medium.

Among his more detailed duties may be mentioned: To keep a plan of the base, see that direction posts are erected, frame standing orders for troops and inhabitants, and regulate markets and police.

In the campaign of 1867 in Abyssinia, when a British expeditionary force under Sir Robert Napier was sent from Bombay, the Government made an enormous reduction on what the General demanded. Among other sources of economy it was decided to dispense with a base commandant, as being an unnecessary luxury; this resulted in hopeless confusion when the force landed at Massour on September 16th of that year.

#### SECTION COMMANDANTS.

With the exception of embarkation and disembarkation, the duties of an Administrative Commandant of a Section are analogous to those of the Base Commandant, though on a smaller scale. In addition he has to work in the closest possible harmony with the local commander of the defences, and with the Railway Control Officer, if one exists.

#### RAILWAY CONTROL OFFICER.

This Railway Control Officer is the local representative of the Director of Railways (*F.S. Regns. II. 59*). In South Africa you knew him by the letters R.S.O. He should be an individual with the tact and temper of an angel, and the less he is interfered with the better his work will be performed.

#### POST COMMANDANTS.

Under each Section Commandant are a varying number of Post Commandants, according to the extent of country included in the section. Their responsibilities are practically similar, though on a still smaller

scale. Diagram 3 shows an example of one of these posts (*diagram 3 explained*).

#### COMMANDANT OF THE ADVANCED BASE.

The duties of the Commandant of the Advanced Base do not differ, except in degree, from those of other Administrative Commandants; but he is especially responsible that the requisitions of the field army are at once complied with, and their worn-out transport replaced.

Two important duties which fall to every Administrative Commandant, of whatever grade, are the careful keeping of a diary and of a map showing the ground within the limits of his authority.

#### SUPPLIES.

Diagram 4 shows in the rough-and-ready form of a graphic how the food is conveyed to the soldier in the field (*diagram 4 explained*). The supplies brought from Woolwich may be supplemented by purchase or requisition in the country; but any such system is only carried out under the strictest rules, and, except in cases of emergency, it may be applied by none but commissioned officers (*F. S. Regns. II. 36 (1)*).

The number of intermediate supply depôts between the depôts at the base and the advanced base, will vary according to circumstances; they will usually be determined by the I.G.C., subject to any instructions which he may have received from General Headquarters. There will always be one of these depôts at railhead. At each successive depôt the stock of supplies will be slightly smaller, as the responsibility ceases of providing for the lines-of-communication troops behind. As a rule, each post holds a month's reserve of supplies for its own consumption, in addition to the average amount required daily to feed the troops passing through, and quite apart from what is kept for the field army. Details of each supply depôt, as of all other lines of communication units, are given in *War Establishments (War Establishments, 1909-10, p. 144)*, and the fullest possible details of their working are found in the *Supply Manual (War) 1909*.

#### ORDNANCE STORES.

As with supplies, so Ordnance Depôts are established at certain intervals (*F. S. Regns. II. 47 (1)*). The replenishment of ammunition must always be more or less spasmodic, according to the course of the operations (*F. S. Regns. II., 48 (1)*), and care will always have to be taken that a sufficient reserve is maintained to meet emergencies; where it is located is a matter for determination by the I.G.C. The principle upon which the reserve of other Ordnance stores is calculated is that it will usually be possible to replenish at intervals of about a fortnight.

#### TRANSPORT.

It is a good general rule that the transport used should be that employed in the country in time of peace. By this means drivers are easier

to secure, and repairs are easier to execute. Transport depôts will be established on the line as required, and the transport used is divided into three classes (*F. S. Regns. II.*, 62 (2)) :—

That working between railhead and the advanced base.

That used to supplement the railway between the base and railhead.

That used for local work at any point on the line.

#### SYSTEM OF CONVOYS.

For convoy work there are three alternative methods which may be employed (*F. S. Pocket Book*, p. 81). The first is the Direct System, by which the same animals and vehicles are employed from the start to the destination. The second is the Staging System, when the transport works always over the same stage, proceeding laden, and returning either empty or with fresh loads. The third is the Meeting System, by which the transport from two adjacent posts starts daily in opposite directions, the loads being transferred when they meet.

The Direct System is usually employed in front of the advanced base only; but it has the advantage that the number of vehicles in each convoy may be made up according to the weight of the loads to be carried, and is also somewhat more convenient for the transport of sick and wounded.

The Staging System is that most usually adopted on the lines of communication.

The Meeting System has the drawback of requiring labour for the transfer of the loads. With pack transport there are occasions when it must be resorted to, if the track is too narrow to enable two convoys going in opposite directions to pass. In this case the loads are dumped on the ground, the empty animals file away home, and the relieving animals are then brought up and loaded. But this cannot be done with wheel transport; for if the road is too narrow to admit of passing, it will be too narrow for any vehicle to be turned round.

#### MECHANICAL TRANSPORT.

What modifications will be possible with the introduction of mechanical transport I am not prepared to say, for it has not yet had a practical test under war conditions. In South Africa it was tried to some extent, but was not an unqualified success. Still, it is safe to predict that in future Continental warfare it will play an important part. We are told that if the Regular Army and Territorial Force ever have to be mobilised at the same time, no fewer than 173,000 horses will be required. Add to this the wastage of war, which certainly cannot be put lower than 100 per cent. per annum, and you get a good idea of the situation.

Some pretty comprehensive trials were held as far back as 1901, when power transport had not approached the state of efficiency which it has reached now. The trials included a distance of 250 miles with full 5-ton

loads, the negotiation of a gradient of 1 in 7, and the crossing of streams and boggy ground in the Long Valley at Aldershot. The tests were successfully performed with the exception of the one over soft ground; and a distance of 200 miles was covered in six consecutive days. The conclusion reached was that each vehicle, which would have considerably overloaded three G.S. wagons, was fully capable of covering considerable distances over hilly English roads under winter conditions, at about 6 miles an hour; and what was done in 1901 can be in no way comparable to what we might expect in 1910. The advantages which may fairly be claimed for mechanical traction are :—

The fuel is less bulky than the forage required for the horses.

The length of the transport train is very much decreased; consequently escorts (if they are employed) can be smaller.

The rate of marching is increased; consequently fewer halting-places will be required.

#### REMOUNTS.

Remount Depôts for the reception, training, and distribution of horses are formed as required on the line of communication. A base remount depôt usually contains 1,000 horses, and an advanced base remount depôt accommodates 300 (*F.S. Regns. II.*, 66 (2)). The most important point is that horses should arrive in the country in sufficient time for them to be acclimatised and made fit after the voyage, before they are required for use. Much of the wastage which took place in South Africa could have been avoided if this had been arranged for; but when horses are scarce, and commanders are crying out about their dismounted men, the remounts cannot be withheld.

#### VETERINARY HOSPITALS.

Veterinary Hospitals for the treatment of sick horses will be established on the line as required, usually at the base and the advanced base (*F.S. Regns. II.*, 67 (2)).

### PART III.—DEFENCE.

Having now reviewed the system by which supplies are passed from the base to the field army, we must see what precautions are necessary to prevent its interruption.

#### COMMANDER OF LINES-OF-COMMUNICATION DEFENCES.

The defence of all concerned is separated from the administrative control and entrusted to the Commander of the Lines-of-Communication Defences, who is solely responsible to the Commander-in-Chief for the tactical security of the line. He is also responsible for the military government of such part of the district as is under martial law (*F. S. Regns.*, II., 11 (2)). His appointment is an innovation. Nothing is laid down as to where his headquarters should be situated, and no doubt this

is omitted advisedly, in order that he may have an entirely free hand. But in the same way that the commander of a field army can only hope to influence the course of a battle so long as he has at his disposal some unexpended reserves to launch at his will, in just the same way the commander of lines-of-communication defences is in the strongest position when he has at his immediate call some troops which are not tied to any particular defences. It is therefore reasonable to suppose that he will more often than not be found at some point where those troops are halted. And they may be either such as are allotted to some specially important point on the line, or in the nature of flying columns. He must be allotted a suitable staff and a sufficiency of defence troops.

#### SECTION AND POST COMMANDANTS.

Usually the line will be divided into sections, each under a section commandant, and each section will be divided into posts, each under a post commandant (*F. S. Regns.*, II. 11 (3)). These sections and posts may, or may not, correspond with the sections and posts for administrative purposes. To each section will be allotted a certain quota of troops; these, again, will be subdivided between the various posts. After these demands have been met, there should still remain such numbers as the commander of the defences may require to act as mobile reserves. It is merely the repetition of the principle carried out in the field, by which local and general reserves are allocated for certain definite purposes. Each post commandant should have a sketch of the country as far as the two adjacent posts, on which he must mark the dangerous spots, positions of piquets, signalling stations, places for convoys to be changed or passed, and escorts to be relieved (*F. S. Regns.*, II. 11 (5)).

#### ARMOURED TRAINS.

When armoured trains are utilised, their garrisons come under the commander of lines-of-communication defences (*F. S. Regns.*, II. 56 (3)). They may usefully be employed to connect detached posts, or to patrol sections of the railway line which are liable to attack at irregular intervals. In no circumstances should they be exposed to artillery fire, or used for reconnaissance unless accompanied by mounted troops (*F. S. Regns.*, I. 40 (3) to (5)).

#### PIQUETS AND ESCORTS.

For the protection of convoys there are two alternative methods of defence which may be employed. Either important points may be piquetted until the convoy has passed, or it may be accompanied by an escort for its defence (*F. S. Regns.*, I. 157 (4)). By far the best method is to employ piquets, and careful consideration will be necessary in each case to decide whether the piquet should be withdrawn at night. As a general principle it is better that the piquets should remain out permanently, otherwise a good deal of unnecessary fatigue is entailed, and

there is always the chance that a piquet going out in the morning may have to fight before it can regain possession of the ground which it occupied the day before. It also entails delay, for the convoys cannot start in the morning until reports are received to show that all the piquets are in position. In savage or guerilla warfare, when little or nothing is to be feared from artillery fire, blockhouses are invaluable, though expensive.

When for any reason the system of piquets is impossible, resort must be had to an escort. In this case advanced, rear, and (if necessary) flank guards should be told off, a certain number of men distributed for purposes of communication, and the main body should move in a central position on that flank of the convoy which is most liable to attack. A convoy, if attacked, should never be halted if it can possibly be avoided.

Neither the Commander of the Defences nor any subordinate of his has any control over troops or stores moving along the line, except in the face of imminent danger (*F. S. Regns. II. 11 (6)*). Conversely, no subordinate of the I.G.C., or officer moving along the line, may interfere in any way with the arrangements for defence. There is only one exception to this rule, and that is that when a hostile attack is in progress, or is known to be imminent, the senior combatant officer on the spot will take command (*F. S. Regns. II. 11 (8)*).

#### PART IV.—THE MEDICAL SERVICE,.

When considering the administrative services before discussing the arrangements for defence, I purposely omitted all mention of the Medical Service, because it is my special object to lay stress on this branch of the tree. A manual entitled "Royal Army Medical Corps Military Training" was issued only last week, and those who have had an opportunity of studying it will have seen that it contains instructions for lectures to be given in every command, on the lines laid down in a recent [Scottish Command Order. And there are two paragraphs which lay down so very clearly how closely Medical Officers must be in touch with military operations that they are well worth quoting here:—

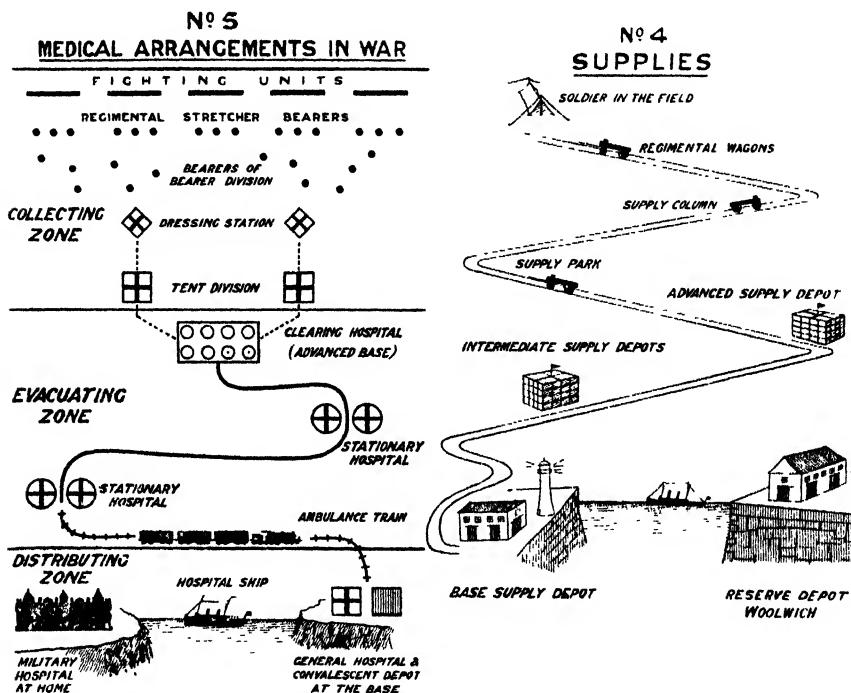
*"The interests of the Army require something even more than professional scientific knowledge from an officer of the Royal Army Medical Corps, because it is impossible for him to carry out his duties efficiently without a certain knowledge of Military Science, especially as regards the administration of an army in the field.*

*"While Royal Army Medical Corps officers are not charged with combatant duties, they are very intimately concerned in the combatant work of the other branches; and the efficient performance of their duties demands some knowledge of the general principles on which military operations are conducted.*

*"They must be capable of understanding from an operation order what is likely to be required of them."*

Before touching on the arrangements for evacuating the sick and wounded belonging to the field army, let us glance at any equally important but smaller and perhaps less interesting matter—the medical care of the troops which work and defend the lines of communication.

As for purposes of general administration and defence, so also for medical organisation, the line is divided into sanitary districts, both the base and the advanced base being kept separate from the remainder of



the line (*F. S. Regns. II. 72 (2)*). The sanitary service on the lines of communication is organised in the same way as with the field units, but on a rather more permanent basis, and comprises sanitary officers, sections and squads. The nucleus of the *personnel* is formed from the Royal Army Medical Corps, and it is supplemented by hired civilian labour (*F. S. Regns. II. 72 (1)*). To the base, railhead, the advanced base and to each district are allotted a sanitary officer and a sanitary section, while a sanitary squad is allowed for every post.

Just as the commanding officer of a unit in the field should work in sanitary matters in close connection with the medical officer doing duty with his unit, so an administrative commandant works in the same way with the sanitary officer of his section; and the duties of the

sanitary officer are analogous to those of a medical officer of health (*F. S. Regns. II.* 72 (4)). He has to supervise food and water supplies, the selection of camp sites, the disposal of sewage and refuse, disinfection and all measures necessary to prevent the introduction and spread of disease. At the base, he will, in addition, act as Port Sanitary Officer, taking special care to prevent the introduction of infectious disease from any transports arriving.

Now to turn to the larger and more interesting question of evacuating the sick and wounded from the field army.

### THE THREE ZONES.

For purposes of medical organisation the country is separated into three zones (*F.S. Regns. II.* 74 [3] and [4]): The collecting zone, the evacuating zone, and the distributing zone.

The collecting zone, as its name implies, covers the area where the sick are collected from their units, and the wounded from the field of battle, and treated in the field ambulances.

The evacuating zone is that to which the sick and wounded are evacuated from the field ambulances, and corresponds with the lines of communication. Its medical establishments include clearing hospitals and ambulance trains.

The distributing zone includes part of the lines of communication, on which are established stationary and general hospitals and convalescent dépôts; it embraces also the hospitals in the home country and the trains or hospital ships used for the transport of the patients from the base.

The subject of this lecture being the lines of communication, we are only concerned this morning with the evacuating zone and part of the distributing zone. In the evacuating zone, as I said just now, are clearing hospitals and ambulance trains.

### CLEARING HOSPITALS (*F.S. Regns. II.* 78).

The normal situation of a clearing hospital, which can accommodate 200 patients, is at the advanced base. It is intended for the temporary reception of sick and wounded received from the collecting zone, and is described as the pivot upon which the whole system of evacuating turns. One clearing hospital is mobilised for every division in the field. If the field army advances, every nerve must be strained to relieve the field ambulances as far as possible, with the object of enabling them to advance empty. With this in view, *personnel* and material from the clearing hospital must be pushed up as far as possible to take over the patients. Intermediate resting places must be organised if necessary.

Having relieved the field ambulances of their patients, the next duty of the clearing hospital is to empty *itself*, by passing the patients another step down the line to the stationary hospitals; and this will be done, if on the railway, by means of the ambulance trains, and, if not, by

utilising such empty wagons as are moving back to bring us supplies and stores, or any other transport which may be provided for the purpose. The provision of such transport is the duty of the Director of Transport or his representative on the staff of the I.G.C., but any fitting up of the wagons which may be necessary becomes the province of the Director of Medical Services.

It is paradoxical, but true, that a medical unit best fulfils its rôle when it is empty. In fact the guiding principle throughout the chain is that every link in the medical organisation should be always trying its level best to empty itself by filling up the next link behind it; and to assist the carrying out of this principle the following rules have been worked out on statistics which have been from time to time most carefully compiled:—

When the force is marching or halted, the average influx of patients is only 0.3 per cent. *per diem*. It is an accepted fact that a force is always healthier when marching than when halted, chiefly because of the daily occupation of fresh ground.

After a general engagement the number of wounded may be expected to vary from 5 to 20 per cent., according to the severity of the fighting.

#### AMBULANCE TRAINS (*F.S. Regns. II. 81*).

One ambulance train, to take 100 lying-down cases, is equipped for each division in the field. During periods of halting or marching a train usually starts from fixed stations at certain prearranged hours, but after an engagement it must be despatched as circumstances require. At Colenso the ambulance train was brought right up on to the field of battle. Water transport, when available, is a very convenient substitute for either road wagons or ambulance trains.

#### THE DISTRIBUTING ZONE.

Leaving the evacuating zone, we enter the distributing zone, where we find stationary and general hospitals, and convalescent depôts at points further down the lines of communication.

#### STATIONARY HOSPITALS (*F.S. Regns. II. 79*).

Stationary hospitals contain each 200 beds, and are located at important points, and at suitable intervals, on the line. They are primarily intended for the reception of those who are likely to require only a short period of treatment to fit them for return to the ranks. But circumstances alter cases; and, after Colenso, so great was the congestion in all the hospitals in Natal that some cases which were fit for duty in three weeks were sent all the way from Durban to Cape Town in a hospital ship, simply because there was no accommodation for them elsewhere.

#### GENERAL HOSPITALS (*F.S. Regns. II. 79*).

General hospitals are considerably larger and better equipped than any other form of hospital in the theatre of war. Each of these con-

tains 520 beds, and maintains a supply of clothing, necessities and equipment for issue to patients. They are usually located at the base.

#### CONVALESCENT DEPÔTS (*F.S. Regns. II. 80*).

Convalescent depôts are generally placed as near as possible to the general hospitals. It is their function to relieve the pressure on the hospitals, by receiving those patients who do not require further surgical or medical treatment, but only to recuperate. They have only a small *personnel* and the number of cases which can be received in each is a variable quantity. Both general hospitals and convalescent depôts will often occupy any buildings which may be adapted for the purpose.

Now we have finished with the lines of communication; and the final act in the drama is when the patient, who is not likely to be able to shoulder his rifle within a reasonable time, is embarked in a hospital ship for his voyage home. On landing he is transferred to a military hospital, probably at Netley; or, if he requires only rest and no medical attention, he is very likely sent to somebody's private house. Lists of such charitably disposed people as are willing to receive convalescents are kept by that excellent organisation—the British Red Cross Society.

## Report.

### THE GERMAN CAMPAIGN IN SOUTH-WEST AFRICA, 1904-06.

(*Sanitäts-Bericht über die Kaiserliche Schutztruppe für Südwestafrika während des Herero und Hottentottenaufstandes vom 1 Januar, 1904, bis 31 Mai, 1907. Erster Band. Administrativer Teil*).

By LIEUTENANT-COLONEL C. H. MELVILLE, AND MAJOR C. E. POLLOCK.  
*Royal Army Medical Corps.*

THIS volume contains the administrative portion of the Army medical report on the above campaign. The matter is divided into the following seven sections:—

- (1) The composition of the force.
- (2) Medical and surgical equipment.
- (3) Sanitation.
- (4) History of the individual medical units.
- (5) Transport of sick and wounded by land.
- (6) Transport to home country, by sea.
- (7) The work of voluntary aid societies.

(1) The strength of the force was taken from the official report of the campaign published by the German General Staff. On January 1st, 1904, the strength present in the Colony (including police) was 827. The

total number of officers and men (including naval detachment) sent out during the campaign was 20,111; the highest strength actually present at any one time was 16,344 at the end of April, 1906. The average annual strength for the whole campaign was 11,240 men. The monthly and average annual strengths are shown in a diagrammatic chart on p. 3 of the report.

*Medical Personnel.*—At the commencement of the campaign there were ten medical officers and forty-four medical subordinates in the colony; as the forces increased the medical *personnel* was reinforced. The total medical *personnel* employed during the expedition was 187 medical officers, six assistant surgeons, one dental surgeon, sixteen apothecaries, thirty-six hospital officials, one instrument maker, 395 bearers (*Sanitätsmannschaft*), 278 hospital attendants (*Krankenwärter*). Taking the average for the whole campaign the proportion was one medical officer to 120 men, and one medical subordinate to every thirty men. Compared to a home (German) division there were about fifty fewer medical officers and eighty more medical subordinates; the increased number of medical subordinates was rendered necessary by the greater prevalence of sickness, as also by the necessity for improvising hospital accommodation, for which there was neither materials nor labour available in the Colony, so that the increased work fell to the medical subordinates. During the campaign the total medical *personnel* (including voluntary aid) was equal to 5 per cent. of the force; the corresponding ratio for the South African Campaign was 4 per cent.

*Losses among Medical Personnel.*—Of 193 medical officers employed during the campaign five were killed and four died of enteric fever, while of 395 bearers seven were killed, ten died of enteric fever, and two were returned as missing. Of 278 hospital attendants ten died (two from enteric).

*Organisation of the Medical Service.*—The home organisation was found to be quite unsuited to the conditions of colonial warfare. A fresh organisation had to be introduced to suit the local circumstances; this is given in Appendix 6a. One of the first alterations which had to be made was in the system of returns in the field; the military requirements necessitated the splitting up of units, consequently it was impossible to adhere to the system of each unit furnishing periodical returns. The following system was adopted: At the end of every ten days each command had to send a telegraphic or heliographic message to the administrative office at Windhuk giving the following figures *always in the same sequence*. The total number of sick, the number of wounded, number of enteric patients, number of malaria patients, unit commander's name. By means of these telegraphic reports the Administrative Medical Officer was kept in close touch with the state of health of each of the scattered detachments and was enabled to foresee where additional medical *personnel*, supplies or transport, would be required.

At the earliest opportunity manuscript returns compiled from the detachment admission and discharge books were sent in duplicate to the Administrative Medical Officer at Windhuk. From these a general admission and discharge book for the whole force was compiled, and this forms the basis of the statistics now being worked out.

*Medical Personnel with the Troops.*—As the troops mostly worked in detached companies, it was soon found necessary to allot a medical officer and two N.C.O.'s. of the medical corps to each company. A certain proportion of the troops was also trained in ambulance work. The fighting mostly took place at close ranges and in consequence of the smallness of the detachments and constant attempts of the enemy to surround them, regular dressing stations as laid down for European warfare were only employed on rare occasions. Wounded men were placed behind a rock or other available cover and left till the fight was over, as experience soon showed that it was highly dangerous to attempt their removal from the fighting line; on one occasion when a wounded officer was being carried to the rear two bearers were killed and two more wounded. The bearers were frequently forced to fight in self-defence. Operative treatment was only undertaken when absolutely necessary.

*Field Hospitals.*—The mobile medical equipment in the colony at the beginning of the war was soon exhausted. The naval detachment brought out a field hospital which was erected at Okahandja and gradually extended. In May, 1904, two more field hospitals, each of thirty beds, were fitted up mainly with equipment purchased from the Red Cross Society. In June, 1904, two complete Prussian army field hospitals, each containing 200 beds and divisible into seven sections of twenty and thirty beds each, arrived in the colony. These had a complete medical *personnel* but no transport animals or drivers, and only one of them had any wagons; their equipment, too, was designed with a view to making use of local resources for housing, bedding, clothing and food, all of which were practically unprocurable in South-West Africa. Consequently, two large hospital tents of fifteen beds each, bedsteads, mattresses, and a supply of food had to be added to the equipment of each section; the total weight per section when equipped for six weeks worked out at roughly 20 tons, to transport which six to seven ox-wagons with eighteen oxen apiece were required. This amount of transport could not be spared for the hospitals, and even if it had been available the condition of the roads in many parts of the colony would have necessitated very slow movements on the part of the columns.

Most of the sections were accordingly allotted to fixed posts as stationary hospitals, and the columns took merely the barest medical necessities. Sick and wounded were sent in to these fixed posts on empty supply wagons.

Considerable difficulty was experienced owing to the scarcity of water, fuel, and labour. For military reasons the hospital frequently had to

be pitched at some distance from the water supply, and at the beginning of the campaign there were no water carts, consequently a great deal of work was thrown on the hospital staff.

*Medical Transport.*—The colonial troops were supplied with one ox-cart per company; this carried the medical equipment and could accommodate two lying-down patients. The hospitals sent out from home brought only a few ambulance wagons, as under the home regulations the transport of sick depends mainly on locally-requisitioned vehicles; a few ambulance wagons were purchased in Cape Town. The transport of sick and wounded remained one of the greatest difficulties till February, 1905, when a special sick transport column of thirty ambulance and forty medical stores wagons with 150 drivers was sent to the colony. Some more wagons were added at a later date. These wagons were divided up among the hospitals and columns, and as they remained under control of the medical authorities the arrangement was found to work well.

(2) *Medical and Surgical Equipment.*—There were a certain number of small hospitals more or less fully equipped in the colony, in addition to which each battery or company of the colonial forces had sufficient medical equipment for itself. Owing to the rapid increase in the forces an immediate increase of medical supplies became necessary; these were obtained mainly from the German army supplies at home, the German Red Cross Society, and to a limited extent by purchase in the Cape Colony. From May, 1904, onwards, the reinforcements sent out from home took with them an elaborate scale of medical equipment which soon after arrival had to be very much reduced owing to lack of transport. The panniers sent out from Germany were found to be too heavy for colonial conditions and were largely replaced by Kohlstock's tropical medicine chests; similarly, the medical officers were unable to carry their regulation instrument cases.

*Housing of the Sick; Huts, Tents, &c.*—In a few places houses were taken over and fitted up as hospitals, but in many cases huts or tents had to be made use of. Some of the tents were provided from the Prussian army stores, some were purchased from private firms, and some were presented by the Red Cross Society.

The Prussian hospital tent M99 was found to be serviceable, and with care it lasted for two years. This tent has double walls with openings for ventilation and is considerably lower than the British hospital marquee; consequently, it was not so liable to damage during the frequent wind-storms. Mud mixed with cow-dung made a hard floor easily kept clean and free from dust; frequent sprinkling with creosol kept down the white ants. This tent accommodated eighteen or even twenty-two beds, or fifty-three patients if simply laid on the ground. Awnings spread over the tent reduced the temperature of the interior by 10° C. as compared with tents not so protected; the sides of the awnings formed verandahs in which the patients could sit by day. The Prussian army dressing-station

tent M87, which is oblong in shape and has single walls open on one side, was not satisfactory as a permanent hospital tent.

The Cape Town tent (very much like the British hospital marquee) was found to be much inferior to the Prussian M99, owing to the difficulty of setting it up, the higher roof which caught the full force of the frequent storms, the bad lighting, and weak construction; on the other hand, it presented the advantage of being warmer on cold nights.

Another useful form of tent was that belonging to the Colonial troops; this consists of a tent pitched round a large two-wheeled ox-cart by means of upright and roof poles. Two men could pitch the tent in ten minutes and it provided fair protection against weather for six to eight lying-down cases; it was only intended for temporary accommodation while on the march.

*Huts.*—The “Döcker” huts were very satisfactory from the point of view of efficient ventilation and protection against rain, but the great drawback was that the temperature in the interior followed closely that of the outside air. During the hot weather the day temperature in them was frequently as high as 107° F., while at night time in winter it fell as low as 23° F. Galvanised iron huts lined with boards inside were also found to be very satisfactory. These were put up in the colony itself. In a few places huts were constructed with sun-dried mud bricks, the roof being formed of saplings covered with brushwood and mud mixed with cow-dung, the walls were covered with sacking on the inside to prevent them from crumbling. These huts afforded good shelter, but were not very durable. A large variety of bedsteads were tried. The most comfortable and durable were those with iron frames and spring mattresses; they were found to be too heavy for transport.

An ingenious arrangement to replace air cushions, which speedily perished, was “Hacker’s” bed-stretcher. This is simply a broad strip of sheeting with loops sewn along each margin, a straight piece of wood is passed through the loops, the two pieces of wood are then firmly tied together underneath the bed so as to stretch the sheeting; by this means any one part of the patient’s back can be protected from pressure.

To obviate the constant trouble of finding thermometers burst by the high temperature, these were constructed with an extra long stem and the lumen was expanded at the top to form a small receptacle.

The greatest difficulty was experienced in obtaining a supply of fresh fruit and vegetables for the patients in hospital. Very little was to be obtained locally, and supplies purchased in Cape Colony were nearly always unfit for use on arrival. The meat was also of poor quality and always tough; some improvement was effected by putting it through a mincing machine.

Many different patterns of stretchers were tried, the most satisfactory one was the “Windler.” This was made of galvanised iron tubing with a canvas body folding in two for carriage. It weighed 22 lb. Two of

these stretchers, two small medical panniers with a few *tentes-d'abri* weighed about 100 lb. and made a comfortable load for one pack mule.

*First Field Dressing.*—The new German army pattern was found to be excellent as it could be applied without being soiled by the fingers, but as there was only one gauze dressing in each, every man had to carry two first field dressings in order to cover the wound of exit as well as the wound of entry.

*Drugs.*—Owing to transport difficulties it was found advisable to send out fluid drugs in capsules containing a single dose, while solid drugs were supplied in tabloid form.

*Röntgen Rays.*—The apparatus was found to be too heavy for field use and was very little missed.

(3) *Sanitation. Climate.*—The coast climate may be described as warm and moist, the relative humidity being generally about 80 per cent.; morning and evening mists were of common occurrence, while dust-storms frequently swept over the district; flies were plentiful, but mosquitoes, in the main, absent. In the interior the climate was extremely dry with a great variation between night and day temperatures; on one exceptional occasion the difference between the day and night temperatures reached 90° F. With the commencement of the rainy season (October) mosquitoes (*Culex*) appeared in great numbers. Towards the end of the season (February), *Anopheles* were also plentiful; flies also became excessively numerous.

*Supplies.*—In the northern portion of the colony these were landed at Swakopmund and sent up country by the narrow-gauge rail; large magazines were established at the various railway stations with smaller depôts at the various posts. In the southern part of the colony a large proportion of the supplies were sent by rail from Port Nolloth to Steinkopf and thence by ox-wagon. A variety of wagons was employed for the transport of supplies, and the usual troubles due to animals dying, necessary repairs to wagons, &c., were experienced.

*Clothing.*—The most useful material was found to be khaki cord, with knitted woollen jerseys in winter time; khaki was much worn in the south, as thorns were not so plentiful as in the north. As a rule, one blanket was carried on the saddle, and as often as not greatcoats had to be left with the heavy baggage, which did not always get up to the troops.

*Underclothing.*—The troops preferred vests and drawers made of cotton, as the woollen ones became hard when washed and irritated the skin.

*Head-dress.*—A broad-brimmed felt hat and a cloth forage cap were issued. The felt hat gave fair protection from the sun's rays, but in a few cases mild insolation occurred in summer. When the brim became soft it had a tendency to hang down and interfere with vision; it also flapped about most uncomfortably in a high wind. Some men tied the flaps of both sides to the top of the hat with a strap or string.

Coloured spectacles were issued to the men, but little use was made of them. The knitted woollen gloves were much appreciated in winter.

*Boots.*—Top boots were issued at first, but later on laced boots and leather gaiters were found to be more serviceable, and were generally adopted.

*Water-bottles, Water-bags.*—Each man had issued to him one aluminium water-bottle covered with felt, capacity  $1\frac{1}{4}$  pints, and two canvas bags having a capacity of, roughly, 6 pints. The water-bags were carried on the horse, the water-bottle on the man.

The load carried by the individual soldier varied somewhat according to the articles of clothing, &c., which he happened to be wearing, but the average weight for a mounted man was  $31\frac{1}{2}$  lb., and for a dismounted man 53 lb.

#### A. GENERAL REMARKS.

The problem of feeding the army in the Herrero Rebellion was rendered extremely difficult by several factors. In the first place the force was much larger than that previously maintained in the Protectorate, and, in addition, increased steadily in size. In the second, not only was the Protectorate poor in natural resources, but the outbreak of hostilities resulted in a considerable diminution of the number of cattle available. The greatest influence, however, was exercised by the deficient development of means of intercommunication.

Even in peace time the country was dependent on imports for the greater part of its supply of indispensable articles of sustenance. Fresh meat was, on account of the large stock of cattle, the only form of food that was present in abundant quantity for the scanty white population, though their needs in the matter of fruit, fresh vegetables, and potatoes could be met in part by local cultivation. The outbreak of the rebellion, accompanied as it was by destruction and looting of cattle, and a general breakdown of all agricultural operations, destroyed even these scanty resources, whilst at the same time the total population, and therefore also the food demand, was multiplied many times over by the increase of the garrison, and the large influx of both white and coloured labour. As a result, the supplies for the troops had to be brought either by sea or by land into the Protectorate. The feeding of the troops had in consequence to be largely carried out by means of preserved foods. The poverty of the local resources was such that in the case of any large body of troops reliance had to be placed entirely on supplies pushed up from the base.

#### B. SOURCES OF SUPPLY.

(1) *Fresh Meat.*—The meat supply of the Protectorate consisted of cattle, sheep, and goats, and in consequence of the pasture conditions consisted in Damaraland mostly of the larger, in Namaland chiefly of the smaller, classes. In small, circumscribed areas pig-rearing was also practised. At the time of the outbreak the only other source of supply

of fresh meat available was Bastardland (District of Rehoboth), where large herds were procurable. Slaughter cattle were purchased from all these sources, but since cows had to be preserved so as not to interfere with cattle breeding in the future, and as there was in addition a great demand for draught oxen, the actual available supply was insufficient to meet the local needs, and cattle had to be procured elsewhere. A regular influx of cattle came overland from Bechuanaland through Rietfontein North, and also from Cape Colony, while additional small supplies came in from Owamboland. Only one consignment of beasts was brought by sea—from the Argentine—but these proved so wild and unmanageable on the road that a further utilisation of this source was not persevered with. All cattle were collected in certain cattle depôts, and kept under continuous veterinary supervision. In the Herrero country the supply of fresh meat was considerably supplemented by looted herds. Occasionally the troops were able to improve their rations by shooting various forms of buck and wild fowl. Out-of-the-way posts, telegraph and heliograph stations, had frequently to depend entirely on the chase for their meat supply, when, owing to their remoteness or the comparative smallness of their garrisons, it was not possible to forward convoys of slaughter cattle to them. It must be added that on the Fish and Orange Rivers the men were able to add to and vary their ordinary rations with fresh fish; a species of shad (*Welsart*) seems to have been the most common species caught.

(2) *Fresh Vegetables*.—At most of the different farms and mission stations in the Protectorate, as well as at the different settlements, a good deal of gardening and some farming was carried on. The produce consisted chiefly of potatoes, maize, various vegetables, fruits, and wine. No corn, however, was grown. The most important of all the vegetable food-stuffs—flour—was not therefore procurable in the country. Since the perishable nature of agricultural produce forbade its being carried for long distances, only those troops that were operating in the immediate vicinity of the railway line or near farms were in a position to avail themselves of a vegetable ration. With a view to rendering posts and hospitals that were badly placed in this respect self-supporting, seeds were sent to all the larger garrisons during the course of the campaign. In addition to vegetables, fresh milk, butter, and eggs were procurable, but in very restricted areas only. Large quantities of potatoes had to be imported to make up for local deficiencies, chiefly from the Cape, but also from the Canary Islands, the South of France, and Germany. An attempt was made to bring a certain amount of fresh vegetables also from the Cape, but this fell through on account of the heavy loss, amounting to 50 per cent. of the total, the result of decay in transit. The larger proportion of the troops, especially those actually in the field, practically received no fresh vegetables. This resulted partly from the cessation of all agricultural operations in the disturbed districts, but also because owing to their

perishable nature it was impossible to dispatch vegetables to any distance, while at the same time their bulk caused them to take up more transport than could be spared for the purpose. Fresh potatoes only could be sent to the troops at the front.

(3) *Preserved Foods*.—These were procured partly through local purchase, but chiefly by importation from the home country and the Cape. The consignments from Germany were chiefly procured from private firms, but to a certain extent also from the Government factories. All imported articles entered either at Swakopmund or Lüderitzbucht, where large warehouses were erected, and a strict supervision maintained by means of a special receiving committee to prevent contaminated articles being sent up-country.

#### C. INFLUENCE OF FORWARDING SYSTEM ON THE FEEDING OF THE TROOPS.

(1) *Curtailing of Rations*.—The fact that the force had to depend for its food entirely on supplies forwarded from the base naturally made itself less felt in the immediate vicinity of the railway, or the large seaports, than in the case of outlying detachments and the field force itself.

In the Herrero campaign, for instance, the development of an efficient transport service by no means kept pace with the increasing strength of the force. This fact, combined with the scarcity of water and fodder, and the length and sandy nature of the roads, told heavily on the overworked cattle and affected very seriously the efficiency of the troops. As a result, immediately after the fight at Waterberg, and still more during the desert operations that followed, the condition of affairs assumed a critical aspect. The difficulty of keeping up communication between the base magazines and the constantly-moving columns, together with the frequent splitting up of these latter into small, often widely-separated, detachments further complicated the position. Inevitably, as a result, supply columns often arrived late, or entirely missed their objective, the refilling of advanced depôts was delayed, detachments had frequently to assist each other from their private resources, and supply columns before reaching their proper destinations had to supply the wants of isolated parties met with *en route*. Troops not immediately in touch with the railway, who, owing to the difficulties of forwarding supplies, were already on a restricted ration (the so-called two-third scale), had often to content themselves with a greater or less curtailment even of this diminished portion. As regards the lack of fresh meat matters were occasionally improved by the capture of cattle, more particularly in the second half of the operations against the Herreros. A picture of the conditions of affairs is given by the reports from some of the outposts. "The troops have had no fresh meat for eight days. Some cases of scurvy." "The detachment has come to an end of its supplies, even though for some days only one-third rations have been issued." "The last issue of two days' rations has had to last for five days," and so on. The troops

which still remained in Herreroland after the Hottentot outbreak in the south profited by the formation of supply columns with wagons made in the home country, but unfortunately the peculiar conditions obtaining in the southern area did not permit of an extension of the system in that locality. The difficulties here were similar to those in the north during the earlier period, but of an aggravated nature, and opportunities for supplementing the lack of food by means of captured cattle were less frequent than in Herreroland.

Occasionally the men were reduced to living entirely on the flesh of slaughtered draught oxen; in one case (the Orange Expedition at the end of 1905), after subsisting for many days on half rations, the troops were forced for seven days to fall back on the transport mules, which furnished the only food they could procure between October 22nd and 29th.

Isolated posts, such as telegraph and heliograph stations, had often to live for months at a time on preserved meat.

TABLE I.—SHOWING COMPOSITION OF VARIOUS FOODSTUFFS IN GENERAL USE.  
*Proportions in 100 grammes.*

Foodstuff	Protein	Fat	Carbo- hydrate	Salts
<sup>2</sup> Beef, lean .. .. .	22.0	1.0	—	1.0
<sup>2</sup> Preserved meat (average) .. ..	22.5	12.5	—	3.5
<sup>2</sup> Bacon, smoked .. .. .	5.0	78.0	—	6.5
<sup>2</sup> Lard ( <i>Schwemeschmalz</i> ) .. .. .	0.3	99.0	—	—
<sup>2</sup> Butter .. .. .	0.5	84.0	0.5	1.0
<sup>2</sup> Flour (wheat and rye), average .. ..	11.5	1.5	73.0	0.75
<sup>2</sup> Biscuit (wheat and rye), average .. ..	11.0	1.0	73.25	1.75
<sup>2</sup> Bread (wheat and rye), average .. ..	6.5	1.0	51.25	1.0
<sup>2</sup> Egg-biscuit ( <i>Eierzweibach</i> ) .. .. .	13.0	3.0	73.5	1.5
<sup>2</sup> Rice, groats, vermicelli, <sup>2</sup> average .. ..	10.5	2.0	73.5	1.0
<sup>2</sup> Pulses, average ( <i>Hülsenfrüchte</i> ) .. ..	24.3	2.0	56.3	3.0
<sup>2</sup> Vegetables, preserved ( <i>Erbswurst</i> ), average .. .. .	18.5	21.0	41.5	11.0
<sup>2</sup> Potatoes .. .. .	2.0	—	22.0	1.0
<sup>2</sup> Dried potatoes .. .. .	5.13	0.21	78.6	2.06
<sup>2</sup> Mixed vegetables, average ( <i>Fingermache gemase</i> ) .. .. .	1.5	0.5	7.0	1.0
<sup>2</sup> Dried vegetables, average .. .. .	12.0	2.5	68.5	6.0
<sup>2</sup> Dried fruits, average .. .. .	2.4	0.65	53.25	1.75
<sup>2</sup> Sugar .. .. .	—	—	100.0	—
<sup>2</sup> Cocoa .. .. .	20.33	28.35	39.5	6.5
<sup>2</sup> Chocolate .. .. .	7.0	22.2	64.9	2.3
<sup>2</sup> Jam ( <i>Fruchtmus</i> ) .. .. .	0.7	—	53.0	0.6

<sup>2</sup> *Kriegssanitätsordnung*, pp. 96, 97.

<sup>3</sup> König, *Prozentuale Zusammensetzung usw. der menschlichen Nahrungsmittel*, 9 Aufl., 1906.

<sup>1</sup> König, *Chemie der menschlichen Nahrungs- und Genussmittel*, Band I., 793.

<sup>2</sup> *Ibid.*, Band II., 963.

(2) *Monotonous Nature of the Ration.*—Here again, as in the previous case, there was little difficulty as concerns feeding the troops in the immediate vicinity of the depots or larger vegetable farms. The field force,

however, suffered not only from a restricted diet, but from a monotonous one as well, the causes of both being identical. Both these had serious effects directly and indirectly on the health of the men. The direction in which this monotony chiefly made itself felt was in the lack of fresh vegetables, with the consequent appearance of scurvy.

#### D. INDIVIDUAL FOODSTUFFS AND ENERGY VALUE OF RATIONS.

The table on page 228 (Table I) shows the percentage composition of the various foodstuffs used. The data are compiled from the Field Service Medical Regulations of January 27, 1907, and from König's "Chemistry of Human Foodstuffs." For the purpose of calculating the energy value of the different articles the proportions allotted to the various dietetic principles are somewhat varied from those in common use. Thus instead of allowing 4.1 calories per gramme of proteid and carbohydrate, and 9.3 calories per gramme of fat, the figures used are 3.4 calories for a gramme of proteid, 9 calories for a gramme of fat, and 3.7 for a gramme of carbohydrate. This is intended to give the net value of the ration, but in translating I have adhered to the more usual figures, the German calculation being placed in brackets—C. H. M.

(1) *Ration Scale of Original Protectorate Troops.*—This scale must be used as the starting point of a discussion of the rations in this campaign. It remained in force till the middle of 1904, and was composed as follows:—

- |                         |                               |
|-------------------------|-------------------------------|
| (1) Fresh meat.. ..     | 1,000 grammes (2 lb. 3.2 oz.) |
| or Preserved meat .. .. | 500 „ (1 „ 1.6 „)             |

*Note.*—“Preserved meat,” under which term bacon is included, should as far as possible be issued only once a week.

- |  |                                 |
|--|---------------------------------|
| (2) Flour for bread .. ..  | 750 grammes (1 lb. 10.4 oz.)    |
| (3) Rice or groats, macaroni, peas, erbswurst,<br>pulse, &c. .. .. | 250 „ (8.8 oz.)                 |
| (4) Coffee .. ..   | 80 „ (3.0 „)                    |
| or Tea .. ..   | 20 „ (0.75 „)                   |
| (5) Sugar .. ..  | 40 „ (1.5 „)                    |
| (6) Dried fruit .. ..  | 30 „ (10 „)                     |
| (7) Salt .. ..   | 30 „ (10 „)                     |
| (8) Lard or butter .. ..   | 40 „ (1.5 „)                    |
| (9) Spice .. ..  | 5 „ (0.17 „)                    |
| (10) Vinegar essence .. ..   | $\frac{7}{10}$ litre (3 minims) |
| (11) Rum .. ..   | $\frac{3}{8}$ „ (1.2 oz.)       |
| or Jam .. ..   | 50 grammes (1.75 oz.)           |

For mobile troops, at discretion of Commanding Officer.

- (1) Three cakes tobacco.
- (2) Two boxes matches.
- (3)  $\frac{1}{2}$  litre of rum (17.5 oz.)

A table is appended (Table II), giving the composition of the ration, in detail.

TABLE II.—COMPOSITION OF RATION ISSUED TO PROTECTORATE TROOPS BEFORE THE WAR (*alten Schutztruppe*).

Items	Amount	Proteid	Fat	Carbo- hydrates	Salts
	Grammes	Grammes	Grammes	Grammes	Grammes
Fresh meat (1000 grm., deduct- ing 20 per cent. for waste)	800	176·0	8 0	—	8·0
Preserved meat .. ..	500	112 5	62·5	—	16·5
Bacon .. ..	500	25·0	390 0	—	32·5
Flour, for bread .. ..	750	86·25	11·25	547·5	5·6
Rice, &c. .. ..	250	26·25	5·0	183·75	2·5
<i>Erbswurst</i> .. ..	250	46·25	52·5	108·75	27 5
Pulses .. ..	250	60·75	5·0	140·75	7·5
Sugar .. ..	40	—	—	40·0	—
Dried fruits .. ..	30	0·7	0·2	16·0	0·5
Lard .. ..	40	0·1	39·6	—	—
Butter .. ..	40	0·2	33·6	0·2	0·4
Jam ( <i>Fruchtmus</i> ) .. ..	50	0·35	—	26·5	0·3

Assuming that fresh meat was given on six days, and bacon or preserved meat on one day per week, rice five times, and pulse or *Erbswurst* once each, with preserved fruit twice a week instead of the rum ration, the average composition of the ration (leaving out the rum) was as given below, viz.:—

Proteids .. ..	281·9 grammes =	1,156 (958) calories.
Fats .. ..	98·95 „ =	919 (890) „
Carbohydrates .. ..	777·3 „ =	3,187 (2,876) „
Total .. ..	5,262 (4,724) „	

If we compare this with the scale laid down in the Field Service Regulations (No. 360) for severe work, we note that this latter contains:—

Proteids .. ..	150 grammes.
Fats .. ..	100 „
Carbohydrates .. ..	500 „
Supplying 3,595 (3,260) calories.	

The scale for moderately severe work consists of:—

Proteids .. ..	120 grammes.
Fats .. ..	56 „
Carbohydrates .. ..	500 „
Supplying 3,063 (2,762) calories.	

The Protectorate ration shows an excess over the ration for hard work, of:—

In proteids .. ..	131·9 grammes.
In carbohydrates .. ..	277·3 „
While fats are in defect .. ..	1·05 gramme.
The excess energy supplied is 1,667 (1,465) calories.	

The ration of the Protectorate troops not only contained a decidedly high energy value, even for hard work, but in addition an unnecessarily high allowance of proteid.

(2) *Ration scale of June 14th, 1904, and August 1st, 1904 :—*

Full ration for troops on lines of communication (*volle portion*).

It was not considered either necessary or practicable to continue so liberal an allowance of fresh meat after the strength of the troops had been increased, and in addition to other changes the new scale brought out in the middle of 1904 showed a reduction of this issue by one half. The new scale was published on August 1, but had as a matter of fact been used as a guide since the middle of June. It was composed as follows :—

- |                               |       |                             |                  |
|-------------------------------|-------|-----------------------------|------------------|
| (1) Fresh meat                | .. .. | 500 grammes (1 lb. 1·6 oz.) |                  |
| or Preserved meat             | .. .. | 350 ..                      | (12·5 oz.)       |
| (Bacon or preserved sausage). |       |                             |                  |
| (2) Bread                     | .. .. | 750 ..                      | (1 lb. 10·4 oz.) |
| or Flour for bread            | .. .. | 750 ..                      | (1 .. 10·4 ..)   |
| With baking powder            | .. .. | 10 ..                       | (0·34 oz.)       |
- } For troops in the field only.

In the case of bakeries on the lines of communication the amounts allowed in lieu of 750 grammes of bread were 540 grammes flour (1 lb. 3 oz.) with 6 grammes baking powder (0·2 oz.).

- |   |       |                        |               |
|---|-------|------------------------|---------------|
| (3) Rice, groats, macaroni, erbs-wurst, and pulse   | .. .. | 325 grammes (11·5 oz.) |               |
| or Dried vegetables   | .. .. | 60 ..                  | ( 2·0 .. )    |
| or Mixed vegetables (French beans, cabbage, &c.)  | .. .. | 400 ..                 | (15·0 .. )    |
| or Dried potatoes   | .. .. | 325 ..                 | (11·5 .. )    |
| or Fresh ..   | .. .. | 1,500 ..               | (3 lb. 5 oz.) |
| or instead of half the allowance of mixed vegetables, 160 grammes dried, or 750 grammes fresh potatoes. |       |                        |               |
| (4) Butter or lard  | .. .. | 60 grammes (2 oz.)     |               |
| (5) Salt ..   | .. .. | 30 ..                  | ( 1 .. )      |
| (6) Dried or preserved fruit..  | .. .. | 30 ..                  | ( 1 .. )      |
| (7) Coffee, unroasted ..  | .. .. | 80 ..                  | ( 3 .. )      |
| or Tea ..   | .. .. | 20 ..                  | (0·75 .. )    |
| (8) Sugar   | .. .. | 40 ..                  | (1·5 .. )     |
| (9) Spice   | .. .. | 5 ..                   | (0·17 .. )    |
| (10) Vinegar or vinegar essence   | .. .. | 7½ litre (3 mms).      |               |

Weekly, in addition to above :—

- |   |                                    |
|---|------------------------------------|
| (11) Rum, Cognac, red or Cape wine                | 0·5 litre (17·5 oz.)               |
| (12) Tobacco (three cakes), or seven cigars or .. | 50 grammes (1·75 oz.) cut tobacco. |
| (13) Two boxes matches.                           |                                    |
| (14) Soap ..                                      | 150 grammes (5·25 oz.)             |

Troops on the lines of communication drew their weekly allowance of items (11) to (14) on Saturday evening.

Soon after the promulgation of this ration-scale alterations had to be made. Thus in August the allowance of butter or lard was raised to 80 grammes (3 oz.); dried fruit, preserved fruit, and sugar to 60 grammes (2 oz.); tea to 30 grammes (1 oz.); rum and cognac to 0·7 of a litre (22·5 oz.); and cigars to twelve a week.

## 232 *The German Campaign in South-West Africa*

Eventually, the complete ration worked out to the following scale, which held good for the greater part of the campaign :—

- (1) Fresh meat .. .. 500 grammes (1 lb. 1·6 oz.)  
(Issued on 18 or 19 days a month from captured cattle in the first place, or cattle purchased locally or in Cape Colony).  
Preserved meat, sausage, bacon,  
ham, or smoked meat .. .. 350 grammes (12·5 oz.)  
(issued on 12 days in the month).
- (2a) Bread .. .. 750 grammes (1 lb. 10·4 oz.)  
(For bakeries on the lines of communication, 540 grammes of flour, half wheat, and half rye, with 6 grammes salt were issued).
- (2b) Flour .. .. 750 grammes (1 lb. 10·4 oz.)  
(For field troops baking their own bread, 375 grammes each of wheat and rye flour, with 10 grammes salt, were issued).
- (3) Rice .. .. 330 grammes (11½ oz.) (3 days a month).  
Grouats .. .. " " " (3 " " ).  
Oatmeal .. .. " " " (1 day " ).  
Vermicelli .. .. " " " (1 " " ).  
Macaroni .. .. " " " (2 days " ).  
Sago .. .. " " " (1 day " ).  
Peas .. .. " " " (3 days " ).  
Beans .. .. " " " (2 " " ).  
Lentils .. .. " " " (1 day " ).  
Preserved vegetables.. .. " " " (5 days " ).  
Sauerkraut .. .. " " " (1 day " ).  
Dried vegetables .. .. 80 " (3 oz.) (5 days " ).  
Fresh potatoes .. .. 1,500 " (3 lb. 5 oz.) (1 day " ).  
Dried " .. .. 160 " (5½ oz.) (1 " " ).  
(Issued in lieu of half a vegetable ration).
- (4) Butter or lard.. .. 80 grammes (3 oz.) }  
(5) Salt .. .. 30 " (1 " ) } (15 days a month each).
- (6) Preserved fruit or dried fruit 60 " (2 " ) (20 or 10 days a month).
- (7) Unroasted coffee .. .. 80 " (3 " ) (14 days a month).  
or Roasted coffee.. .. 66·6 " (2½ oz.) (6 " " ).  
or Tea .. .. 30 " (2 " ) (10 " " )
- (8) Sugar .. .. 60 " (2 " )
- (9) Spices .. .. 5 " (0 17 " )  
(Pepper, cloves, bay leaves, nutmeg, cinnamon, carraway seeds).
- (10) Vinegar essence .. .. ⅓ litre (3 minims).
- (11) Rum .. .. ⅓ " (3·5 oz.) (20 days a month).  
Cognac .. .. ⅓ " (3·5 " ) ( 6 " " ).  
Arrak .. .. ⅓ " (3·5 " ) ( 4 " " ).
- (12) Tobacco .. .. 3 cakes (10 " " ).  
Cigars .. .. 12 (15 " " ).  
Cut tobacco .. .. 66·6 grammes (2½ oz.) ( 5 " " ).
- (13) Two boxes matches.
- (14) Soap .. .. 150 " (5·25 oz.)

(13 and 14 were in all probability weekly issues, but this is not definitely stated in report.—C. H. M.).

Table III gives the composition of this ration ; the letters (a) and (b) are intended to denote the earlier and later issues of certain articles

before and after August, 1906. The number of issues of alternative food-stuffs made during the month are also shown.

TABLE III.—SHOWING COMPOSITION OF FULL RATION (*volle portion*).

Items (number of times issued during month of 30 days)	Amount	Proteid	Fat	Carbo-hydrates	Salts
	Grammes	Grammes	Grammes	Grammes	Grammes
Fresh meat (500 grm., deducting 20 per cent. for waste), 18 times .. .. .	400	88.0	4.0	—	4.0
Preserved meat, 10 times ..	350	78.75	43.75	—	12.25
Bacon, twice .. .. .	350	17.5	273.0	—	22.75
Bread, daily .. .. .	750	48.75	7.5	384.4	7.5
Rice, &c., 11 times .. ..	330	34.65	6.6	242.5	3.3
Pulses, 6 times .. .. .	330	80.0	6.6	185.8	9.9
Preserved vegetables, 5 times	330	60.0	69.3	136.9	36.3
Mixed vegetables, once { (a)	400	6.0	2.0	28.0	4.0
{ (b)	330	5.0	1.65	23.0	3.3
Dried vegetables, 5 times { (a)	60	7.2	1.5	41.1	3.6
{ (b)	80	9.6	2.0	54.8	4.8
Fresh potatoes (1500 grm., deducting 10 per cent. for waste), once .. .. .	1,350	27.0	—	297.0	13.5
Dried potatoes, once (issued with half vegetable ration)	160	8.3	0.3	127.2	3.3
Butter, 15 times .. .. . { (a)	60	0.3	50.4	0.3	0.6
{ (b)	80	0.4	67.2	0.4	0.8
Lard, 15 times .. .. . { (a)	60	0.18	59.4	—	—
{ (b)	80	0.2	79.2	—	—
Jam, 20 times .. .. . { (a)	30	0.2	—	16.0	0.2
{ (b)	60	0.4	—	32.0	0.4
Dried fruits, 10 times { (a)	30	0.7	0.2	16.0	0.5
{ (b)	60	1.4	0.4	32.0	1.0
Sugar, daily .. .. . { (a)	40	—	—	40.0	—
{ (b)	60	—	—	60.0	—

The average composition and value of the above ration were as follows:—

When the articles marked (a) in the table were issued:—

Proteid .. .. .	172 grammes	—	705 (585) calories.
Fat .. .. .	114 „	=	1,060 (1,026) „
Carbohydrates ..	615 „	=	2,522 (2,277) „

When articles marked (b) were issued composition and value were as follows:—

Proteid .. .. .	172 grammes	—	705 (585) calories.
Fat .. .. .	132 „	=	1,228 (1,188) „
Carbohydrates ..	651 „	=	2,669 (2,409) „

The total value of the first was thus 4,287 (3,888) calories; of the second 4,602 (4,182) calories. This was furnished in the following proportions by the different principles (the percentages in brackets are founded on the German system of calculation):—

	First scale (a)	Second scale (b)
Proteids .. .. .	16.4 (15)	15.3 (14)
Fats .. .. .	24.6 (26.3)	26.7 (28.4)
Carbohydrates ..	59.0 (5.4)	55.0 (57.6)

The percentage of animal proteid to total proteid was 50 per cent., whereas VOIT states that 35 per cent. is sufficient. (In our Field Service ration the proportion of animal proteid is decidedly higher than either of the above. If tinned meat and biscuits are issued the animal proteid comprises 66 per cent. of the whole, with fresh meat and bread over 90 per cent, C.H.M.).

The above-described full ration (*volle portion*) was in force only in the vicinity of the railway, and a footnote on the scale promulgated on August 1st, 1904, laid down that "so long as the local conditions are such as to render difficult the forwarding of supplies, all troops not in direct touch with the railway shall receive only two-thirds the above amounts."

TABLE IV.—SHOWING COMPOSITION OF TWO-THIRDS RATION.

Items	Amount	K.V.V. <sup>1</sup>	Proteid	Fat	'Carbo- hydrates	Salts
	Grammes	Grammes	Grammes	Grammes	Grammes	Grammes
Fresh meat (500 grammes, deducting 20 per cent. for waste) .. ..	400	375 <sup>2</sup>	88·0	4·0	—	4·0
Preserved meat .. ..	233	200	52·4	29·1	—	8·1
Bacon .. ..	233	200	11·6	171·7	—	15·1
Bread .. ..	(500 or 600	750	32·5	5·0	265·25	5·0
Rice, &c. .. ..	220	125	23·0	4·4	161·7	2·2
Pulses .. ..	220	250	53·5	4·4	123·9	6·6
Preserved vegetables .. ..	220	150	40·7	46·2	91·3	24·2
Mixed vegetables .. ..	(a) 266 (b) 220	330	3·9 3·3	1·3 1·1	16·3 15·4	2·6 2·2
Dried vegetables .. ..	(a) 40 (b) 60	60	4·0 7·2	1·0 1·5	27·4 41·1	2·4 3·6
Fresh potatoes (1000 grammes, deducting 10 per cent. for waste) .. ..	900	1,500 <sup>3</sup>	18·0	—	198·0	9·0
Dried potatoes .. ..	107	—	5·4	0·2	84·0	2·2
Butter .. ..	(a) 40 (b) 60	—	0·2 0·3	33·6 50·4	0·2 0·3	0·4 0·6
Lard .. ..	(a) 40 (b) 60	—	0·1 0·18	39·6 59·4	—	—
Fruit Syrup .. ..	(a) 20 (b) 40	—	0·1 0·2	—	10·6 21·2	0·1 0·2
Dried Fruit .. ..	(a) 20 (b) 40	—	0·4 0·8	0·2 0·4	11·7 23·4	0·3 0·6
Sugar .. ..	(a) 26 (b) 40	17	—	—	26·0 40·0	—

<sup>1</sup> The figures in this column represent the ordinary field-service ration of the German army (*Kriegsportion*), vide "Third Report (on Food) of Committee on Physiological Effects of Food, Training, and Clothing on the Soldier," *Journal of the Royal Army Medical Corps*, vol. xiii. (October, 1909), p. 466.

<sup>2</sup> Twenty per cent. should be deducted from this figure for waste = 300.

<sup>3</sup> Ten per cent. should be deducted from this figure for waste = 1,350.

The rationing of the troop units in the immediate vicinity of the line of rail must be looked on as decidedly liberal, since the energy value

supplied is above the lower limit laid down in the K.S.O. for severe work. This liberality had, however, a distinct advantage since, even on the lines of communication, the men were not infrequently called on for severe exertion, whether in the form of long-distance patrols, or fatigues of all sorts, and in addition there were in this area a considerable number of men who had been sent back from the front, and whose recovery from the effects of their hardships depended chiefly on a liberal diet.

(3) *The Two-thirds Scale for Troops in the Field*.—The footnote to the scale of August 1st, 1904, already referred to, applied to all detachments not immediately in the vicinity of the rail, to movable columns, and to the field force more particularly. The two-thirds scale, as it may be called, did not, however, apply to fresh meat, since in the case of this item the difficulty of forwarding did not come so much into question, and looted cattle were generally relied on for its supply. In addition, the increased rum ration of 100 cc. ( $3\frac{1}{2}$  oz.) was, in view of the marked prevalence of intestinal trouble, introduced at an early date.

The different items composing the two-thirds ration, with their individual composition, are given in Table IV. In this table the items marked (a) refer to the earlier periods; those marked (b) the somewhat larger issues that were available after October, 1904.

If we assume that the different foodstuffs were issued on the same number of days in each month, as in the case of the full ration (*vide supra*) we find that the energy value of the two-thirds scale works out as follows:—

When the quantities noted (a) were given with a bread ration of 500 grammes:—

Proteids .. ..	132.75 grammes	=	544	(451) calories.
Fats .. ..	76 ..	=	707	(684) ..
Carbohydrates ..	411.90 ..	=	1,899	(1,524) ..
Total				= 2,940 (2,659) ..

The percentage amount of energy furnished by the different proximate principles being as follows:—

Proteids .. ..	18.6	(17)
Fats .. ..	24.0	(25.7)
Carbohydrates ..	57.4	(57.3)

The addition of 100 grammes of bread to the above gives the following amounts:—

Proteids .. ..	139.25 grammes	=	571	(473) calories.
Fats .. ..	77 ..	=	716	(693) ..
Carbohydrates ..	463.15 ..	=	1,899	(1,714) ..
Total				= 3,186 (2,880) ..

The percentage amount of energy furnished by the different proximate principles being:—

Proteids .. ..	18.0	(16.4)
Fats .. ..	22.3	(24.0)
Carbohydrates ..	59.7	(59.6)

When the scale denoted in Table IV by (b) was in use with 500 grammes of bread the composition of the ration was as follows :—

Proteids .. ..	132.75 grammes	=	544	(451) calories.
Fats .. ..	94.2	"	=	876 (848) "
Carbohydrates ..	435.85	"	=	1,787 (1,603) "
		Total =	3,207 (2,902)	"

The percentage energy furnished by each of the proximate principles being :—

Proteids .. ..	16.9 (15.5)
Fats .. ..	27.3 (29.2)
Carbohydrates ..	55.8 (55.3)

Adding 100 grammes of bread to this scale we now get :—

Proteids .. ..	139.25 grammes	=	571	(473) calories.
Fats .. ..	95.20	"	=	885 (857) "
Carbohydrates ..	497.1	"	=	2,088 (1,839) "
		Total =	3,494 (3,162)	"

The percentage energy furnished by each of the proximate principles being :—

Proteids .. ..	16.1 (14.9)
Fats .. ..	25.5 (27)
Carbohydrates ..	58.4 (58.1)

We see from the above that the two-thirds ration was equal to the usually accepted lower limit of food necessary for slight work (2,770 calories), as well as to that laid down in the K.S.O. for moderate work. It did not, however, come up to the lowest level of a suitable field ration (3,000 calories). This discrepancy could only be removed when an increase in the fresh-meat ration, above 500 grammes (1 lb. 1.6 oz.), say an additional 300 grammes, was feasible. This would give, after the deduction of 20 per cent. for waste, an additional supply of 240 grammes (in original, 250) equivalent to 238.8 (210) calories. Such an addition, or even a greater one, was demanded, more especially on days when, owing to an unfavourable grouping of the various foodstuffs, the average energy value of the two-thirds ration was not attained, as in the following instance :—

Foodstuff	Weight (Grammes)	Proteids Grammes	Fats Grammes	Carbohydrates Grammes	Salt Grammes
Fresh meat (500 grammes, with deduction of 20 per cent. for waste)	400	88.0	4.0	nil	4.0
Bread .. ..	500	32.5	5.0	256.25	5.0
Rice .. ..	220	16.5	2.2	171.6	1.1
Butter .. ..	40	0.2	33.6	0.2	0.4
Dried fruit ..	20	0.4	0.2	11.7	0.3
Sugar .. ..	26	nil	nil	26.0	nil
Totals .. ..		137.6	45.0	465.75	10.8
Equivalent to an energy value of 2,892 (2,596) calories.					

In this case there is a deficiency of upwards of 400 calories, which demands an addition of more than 500 grammes of fresh meat. In this particular case such an increase was, in addition, called for by the fact that the usually accepted standard of salts, 35 grammes (1½ ounce) was not reached. The question as to whether the troops placed on the two-thirds scale were or were not sufficiently fed depended in the second phase of the Herrero Expedition entirely on whether they were able to get an abundant supply of fresh meat or not. In the absence of this it was insufficient. On the other hand, the estimated energy value of the two-thirds ration on the higher scale (items marked *b* in Table IV), viz., 3,351 (3036) calories, was sufficient without any addition of fresh meat, and the grouping of the various foodstuffs agreed fairly closely with the rules of the K.S.O. As a matter of fact, experience tallied fairly closely with theory on this point. Troops receiving the two-thirds scale uncurtailed, and with the higher amounts noted in Table IV, were sufficiently fed.

At the same time it must still remain a question whether an energy value of 3,000 calories is sufficient to preserve troops from under-feeding in South-West African conditions for a prolonged period. Many facts point to the conclusion that the metabolism of men on field service is not only in excess, but constantly in excess, of that required for hard work. Another point to be kept in mind is the elevation above the level of the sea of the theatre of war. This was, to a considerable extent, modified, it is true, by the sub-tropical nature of the climate; still, it must not be forgotten that an elevation of 1,300 metres (4,250 feet) markedly increases metabolism. Whereas the metabolism of a man weighing 70 kilogrammes (11 stone) is, according to Rubner, 3,094 calories, during moderate work, Zuntz and Loewy place it (for a man of the same weight) at 3,500 in the mountains. In addition, it is certain that the peculiarly cold nights of the dry season induced an increased loss of heat, and therefore an exalted metabolism in the movable columns which were exposed to them in their bivouacs. The constant life in the open air had undoubtedly a similar effect. Nor must the constant attention necessary for the care, watering, and feeding of the draught and saddle horses be forgotten. Marches had to be made as far as possible in the coolest hours of the day, or in the night, and broken up by frequent halts. In these, it is true, many of the men were able to snatch a certain amount of sleep, but a really satisfying long night's rest was denied to almost all. Even the days chosen for complete repose were equally broken up by these duties. The all-pervading plague of flies also hindered sleep. Since metabolism is markedly lower during sleep, any shortening of the time devoted to rest leads to a marked loss of weight. Even when troops were halted for some time in one place the fact that the detachments were comparatively weak in strength caused extra work to be put on individual men, by reason of the numerous camp fatigues, of a sanitary or military nature that had to be performed, these being often of a very laborious nature. The

constant nerve-strain of field service also tends to lower very importantly the strength of the soldier. The force being composed very largely of infantry soldiers, the fact that riding was an unaccustomed art added considerably to their labours. Again, the unavoidable loss and inefficiency amongst the riding horses resulted in many of the men having to march for days at a time over sandy roads, or in pathless hills cut up by numerous ravines, in a hot climate. The long-drawn-out incessant battles carried through under the most trying conditions added to the exertion demanded of the men. Lastly, thirst played an important part. The troops very often suffered from lack of water, and as is shown by Rubner loss of water if carried to excess leads to a breaking-down of red blood corpuscles, and consequent increased destruction of nitrogenous tissue. We can conclude then, that, while a ration supplying 3,000 calories may be looked upon as being sufficient for troops in the field while halted, it cannot be admitted as sufficient at times when extraordinary exertions are demanded of them. At such a time the energy value must be increased by increasing the issue of fresh meat. Much less can we escape the conclusion that any cutting down of the ration must result in damage to the condition of the soldier.

An instance of this occurring may be quoted in the case of the detachment at Grootfontein North, between October and December, 1904, when bacon, sugar, fat, and dried fruit were unobtainable. The following table gives the estimated composition of the food received :—

Foodstuff	Weight Grammes	Proteids Grammes	Fats Grammes	Carbohydrates Grammes	Salt Grammes
Fresh meat .. ..	500	88.0	4.0	<i>nil</i>	4.0
(20 per cent. deducted for waste)					
Bread .. ..	500	32.5	5.0	256.25	5.0
Rice .. ..	220	16.5	2.2	171.6	1.1
Totals .. ..		137.0	11.2	427.85	10.1
(Equivalent to 2420 (2150) calories.)					

or when instead of fresh meat preserved meat was issued :—

Foodstuff	Weight Grammes	Proteids Grammes	Fats Grammes	Carbohydrates Grammes	Salt Grammes
Preserved meat .. ..	233	52.4	29.1	<i>nil</i>	8.1
Bread .. ..	500	32.5	5.0	256.25	5.0
Rice .. ..	220	16.5	2.2	171.6	1.1
Totals .. ..		101.4	36.3	427.85	14.2

having a value of 2,507 (2,254) calories ; on an average, 2,463 calories or in round numbers 2,400 (2,200) calories. These figures are below or only just above the energy output of a starving man, which may be taken at 2,303 calories, according to Rubner. (This, presumably, refers to a starving man leading a sedentary life, not in absolute repose. The latest observations of Benedict give 1,696 calories as the daily loss of a starving man at rest, whilst Zuntz and Loewy, *Lehrbuch des Physiologie des Menschen*,

1909, p. 700, give 1,700 for absolute rest ; 2,200-2,550 for a purely sedentary life, reading and writing only.—C. H. M.) When a two-thirds ration had to be extended to last over two days, the average energy value per day was reduced to 1,500-1,400 calories, or a deficiency of 1,500-1,600 calories. To make this up by an extra issue of fresh meat about 2,000 grammes (4 lb. 6.4 oz.) would have to be given. Such an amount, under the most favourable conditions of preparation and variety, could seldom be tolerated. Under the actual conditions of the campaign it would be out of the question.

To make up a deficiency of nutritive material by means of fresh meat alone is obviously possible within certain limits, and under certain conditions only. Accepting Rubner's rule that the amount of food derived from the animal kingdom should be between 738 and 948 grammes a day (roughly  $1\frac{1}{2}$  to 2 lb.), it is impossible. 1,000 grammes (2.2 lb.) is the outside that a single individual could make use of, in addition to the above half-ration. This would only give about 995 (840) calories.

The condition of affairs becomes even more difficult when nothing but fresh meat is available. According to Muonk and Ewald, 210 grammes of carbon are necessary per day to avoid loss of fat. This amount is contained in 1,600 grammes of fat-free meat. To furnish 3,000 calories, with 35 grammes of salts, it is necessary to eat 3,500 grammes (7.75 lb.) of lean meat. To make such a large ration of meat eatable in the absence of all garnish, is a matter of extreme difficulty. Quite apart from that, however, it is impossible, according to Rubner, to feed a man completely and suitably on meat alone, not merely on account of the insufficient nutritive power of the proteids, but because it is physically impossible for a man to eat such a large quantity of meat. Munk and Ewald managed to make a man eat 1,600 grammes (3.5 lb.) in one day, but found it impossible to continue, since even with the most tasty methods of preparation a distaste set in for so large a proportion of meat, and after several days of forced feeding, intestinal trouble manifested itself in headache, discomfort, and nausea, &c. Later observations by Ranke show that though he was able to consume 2,000 grammes (4.4 lb.) of flesh a day, on the third day he could not manage more than 1,281 grammes (2.8 lb.), whilst of the larger amount he was only able to absorb 1,300 grammes. Rubner, who was the same weight as Ranke, was unable to eat more than 1,435 grammes (3.1 lb.), but on the other hand managed to absorb the whole of this.

Moreover, even when it is feasible to consume 1,600 grammes (3.5 lb.) of lean meat, this furnishes merely 1,591 (1,341) calories, and 16 grammes of salts, or only about half the amount used up in starvation. It must be remembered too that a purely flesh diet makes greater demands on the bodily energy in the process of digestion than a mixed diet.

In consequence of the fact that the supply of a sufficient ration, more especially when the greatest demands were made on the energy of the men, was barely possible, and also since it was on these occasions that

the rations were largely, occasionally entirely, composed of meat, it follows that just when the men and troops were exposed to the greatest exertions they were the worst fed. At such times it is beyond a doubt that they had to make up the deficiency of their nourishment from the tissues of their bodies. As a result, whenever the men, actually engaged in active operations, did not receive at least their uncurtailed two-third ration, they showed inevitably after a time signs of starvation, a fact which was frequently observed.

#### (4) *Iron Ration.*

The iron ration (*eiserne portion*) consisted of:—

- |                                  |              |   |
|----------------------------------|--------------|---|
| (1) Preserved meat .. ..         | 200 grammes. |   |
| (2) Preserved vegetables.. ..    | 150 ..       |   |
| (3) Hard bread or biscuit .. ..  | 500 ..       | { with bacon or smoked meat<br>(amounts not stated.—C. H. M.) |
| or Egg biscuit .. ..             | 400 ..       |   |
| or 250 grammes of each           |              |   |
| (4) Roasted compressed coffee .. | 25 ..        |   |
| (5) Salt .. ..                   | 25 ..        |   |
| (6) One cake tobacco.            |              |   |

The composition of this ration is shown on Table V.

TABLE V.—SHOWING COMPOSITION OF THE IRON RATION (*eiserne portion*).

Foodstuff	Amount	Proteids	Fat	Carbo- hydrates	Salt
	Grammes	Grammes	Grammes	Grammes	Grammes
Preserved meat ... ..	200	45·0	25·0	—	7·0
Bacon .. ..	200	10·0	156·0	—	13·0
Preserved vegetables .. ..	150	27·75	28·5	62·25	16·5
Biscuit .. .. {	500	55·0	5·0	366·25	8·75
{	250	27·5	2·5	183·12	4·37
Egg biscuit .. .. {	400	52·0	12·0	294·0	6·0
{	250	32·5	7·5	183·75	3·75

The energy value of the iron ration was 1,800 calories, or with bacon 3,600 calories. The troops were frequently reduced to living on this ration, and occasionally it was impossible to avoid having to spin it out for more than one day.

(*To be continued.*)

## Reviews.

A SYSTEM OF SYPHILIS. In six volumes, edited by D'Arcy Power, M.B.Oxon., F.R.C.S., and J. Keogh Murphy, M.C.Cantab., F.R.C.S. Vol. iv., SYPHILIS OF NERVOUS SYSTEM. By F. W. Mott, M.D., F.R.S., F.R.C.P.

Dr. Mott's researches on "Syphilis of the Nervous System" are so well known that a system such as the above would have been incomplete if it did not contain some contribution from his pen. The managers and editors have recognized this most generously, and few who read this work will disagree with the wisdom of their decision to give the author the scope of a whole volume in which to give us the benefit of his great experience in this important subject.

His deductions from his observations frequently throw great light on otherwise obscure questions connected with this subject, and are a stimulus to others to approach their work in the logical spirit which he displays. Too many works on nervous diseases consist of somewhat dull lists of symptoms which utterly fail to produce the useful mental picture. This is not the case here. Each group of diseases is richly illustrated by case reports, *post-mortem* examinations, and the deductions therefrom, with remarks which closely correlate the clinical and pathological findings and give one a clear idea of the process which is taking place.

The distinction between purely syphilitic lesions of the nervous system and parasyphilis is carefully drawn. Dr. Mott agrees with the great majority of workers in the aphorism "no syphilis, no tabes," but not that tabes and general paralysis are quaternary syphilis, and supports his argument with very convincing reasons. One may not agree with his theory that tabetic affections are the expression of neuronie decay resulting from the continual throwing off of anti-spirochæte immune bodies by the neurons, but one must agree that it is a theory which displays a very acute reasoning power.

The importance of local blood supply and the effects of syphilitic lesions thereon are emphasized, and peculiarities of vascular supply are held to account for localization of syphilitic lesions to special parts in certain cases—*e.g.*, the mid-dorsal region of the cord. Great importance is attached to stress and injury in determining the localization of lesions.

The remarks which show the resemblance between trypanosome and parasyphilitic lesions of the nervous system, and yet the distinction between them, are very interesting, while those which bring together the known facts regarding the manifestations of syphilitic and the different trypanosome affections generally show the close resemblance which is often apparent between the habits of the two organisms. The question of the existence of a special neurotoxic spirochæte, which has been held to account for the frequency with which infection from one source has resulted in many cases of tabes or general paralysis, is closely discussed and rejected. The chapter on prognosis and treatment is carefully written and contains much that will assist the reader under frequently

trying circumstances. The illustrations and plates are many and excellent, and complete a volume which, we feel sure, no one who has to deal with a case of syphilis of the nervous system can afford to neglect consulting.

L. W. H.

**THE AFTER-TREATMENT OF OPERATIONS.** By P. Lockhart Mummery, F.R.C.S.Eng., B.A., M.B., B.C.Cantab., Senior Assistant Surgeon, St. Mark's Hospital for Fistula and other Diseases of the Rectum, and to the Queen's Hospital for Children. Third edition. London: Baillière, Tindall and Cox, 1909. Pp. ix. + 251. Price 5s. net.

We welcome with great pleasure the third edition of this extremely useful work. Very extensive alterations and additions have been made and several chapters are rewritten. We would draw special attention to the chapter on abdominal surgery, the article on general peritonitis, and the chapter on shock, which has been revised and brought up to date.

Chapters vi. and vii. deal respectively with thrombosis following operations and post-operative and drug rashes; the diagnosis of the conditions is lucidly given, and the lines of treatment are clearly defined.

Serum and vaccine treatment is entered into sufficiently to indicate when it would likely be efficacious. Many operations depend for their success on the way in which the treatment is afterwards carried out, and many an almost hopeless case can be saved by skilful after-treatment.

In the appendix will be found clearly laid down methods of nasal, subcutaneous, and rectal feeding. This book should prove invaluable to everyone who has either to direct or carry out the treatment of those who have undergone operations.

C. B. L.

**STUDENT'S HANDBOOK OF OPERATIVE SURGERY.** By W. I. de Courcy Wheeler, B.A., M.D.Dubl., F.R.C.S.I. London: Baillière, Tindall and Cox., 1910. Pp. xiii. + 295, crown 8vo. Price 7s. 6d. net.

In this little book of 300 pages the author describes the methods which he demonstrates to his classes in operative surgery. The book contains descriptions of most of the operations commonly practised on the dead subject. The author's style is brief and concise, and he writes with a refreshing directness which precludes the possibility of ambiguity, and leaves no doubt in the reader's mind as to the meaning intended.

Possibly a more detailed description of some operations might have been undertaken, such as Stacke's operation, but, as in this case life may be learnt without actual practice, the brevity of the description is justified.

The book contains 150 illustrations, which are explanatory to the text and of valuable assistance in a descriptive work.

A short account of the collateral circulation is appended to the descriptions of arterial ligation. This is a happy inclusion, and will save the student many a weary search in "Gray" or "Cunningham" for anastomosis partially described in one volume and only fully described in the closing pages of the next.

As operations on the cadaver are still undertaken as a test of surgical proficiency, the student must perforce practise the tricks of the dissecting room, and in this handbook he will find all the information required of him to satisfy an examiner in operative surgery on the dead subject.

J. W. F.

**FEVERS IN THE TROPICS.** By Leonard Rogers, Major I.M.S. Second edition. London: Henry Frowde and Messrs. Hodder and Stoughton, 1910. Pp. xvi. + 428. Price 21s. net.

In this second edition of his book on tropical fevers Major Rogers has added the more recent work in the form of an appendix. He gives a summary of recent work on kala-azar and sleeping sickness which brings us down to the last reports of the Royal Society's Commission on the Method of Transmission of Trypanosomiasis. A great part of the addendum is taken up with an essay on liver abscess and amœbic hepatitis, in which are included more records of the results of ipecacuanha treatment in the prevention of abscess. The author states that for the last four years in the Calcutta General Hospital no case of hepatitis which was not already suppurating on admission has gone on to abscess; some of the cases which he quotes are very striking in that from the symptoms it seemed all but certain that an abscess had formed and yet under ipecacuanha the symptoms subsided completely. The doses recommended by Rogers are: 30 grains each evening, preceded by 20 minims of tr. opii, or 20 grains of chloral hydrate, and he keeps up the administration for from ten days to three weeks after the fever has disappeared; during the latter part of the time the dose is reduced to 20 grains, then to 10 grains, and at the end the drug is given only every other night. He notes the rapid development of tolerance for ipecacuanha which occurs. The peculiar character of the leucocytosis in amœbic hepatitis is again insisted on, it consists in a general increase of white cells without any special alteration in the proportions which the polymorpho-nuclear cells bear to the other white corpuscles; the former average, as a rule, between 70 per cent. or 80 per cent. of the whole, and in chronic abscesses may even be below 70 per cent. The author also gives details of the special cannula which he has devised to facilitate the treatment of abscess by aspiration and daily injection of quinine solution. There follow some remarks on epidemic dropsy, in which, among other things, one notes the fact that the knee-jerk is almost invariably absent in beri-beri and almost invariably present or increased in epidemic dropsy; he also points out the much more marked anæmia which occurs in the latter disease, contrasting with beri-beri, where anæmia is not a striking symptom, if present at all. This refers, of course, to the anæmia detected by a blood count, and not to facial pallor, which may be consistent with a normal blood count. The book ends with some remarks on the etiology of plague and with an epitome of recent work on blackwater fever. Tropical practitioners will find a great deal that is interesting and profitable in its perusal.

W. S. H.

## Current Literature.

**Considerations affecting the Evacuation of Wounded.**—(The substance of this paper has been mainly derived from "Monographie IV., aus dem Gebiete des Feldsanitätsdienstes," by Cron and Bayer, Saffar, Vienna, 1907). The authors begin by pointing out that it is impossible to furnish field medical units with a sufficient number of ambulance wagons to remove the mass of wounded which results from modern battles, and that consequently the removal of wounded to the base must to a great extent depend on improvised carriage. Improvised vehicles are, however, much inferior to the carefully constructed and equipped ambulance wagons, and should therefore be reserved for those patients who are best able to bear a certain amount of discomfort. This necessitates a selection of patients at the clearing hospitals.

The classification into "severe" and "lightly" wounded made at the dressing station is based largely on the effect which the wound is likely to have on the man's future efficiency as a soldier, but this classification does not always coincide with his capabilities for standing fatigue while being transported to a general hospital. Thus a man who has lost a thumb is correctly returned as "severely wounded" because he will be unfit for further service, but from the point of view of the director of clearing hospitals he is a trivial case; conversely a man shot through the buttocks is returned as having a slight wound, but for transport purposes he is a severe case.

When making nominal rolls of men for conveyance by road or rail the classification must be based on the degree of disturbance to the man's powers of locomotion which the wound has produced, and he will accordingly be placed in one of the four following categories:—

(1) Fit to march, *i.e.*, men who could be expected to march ten to fifteen miles a day. The number may be estimated at 20 per cent. of the total number of wounded.

(2) Sitting-up, *i.e.*, men who are able to look after themselves to a certain extent but who are not fit to march. They should form about 30 per cent. of the total number of wounded.

(3) Lying-down. These are mostly severe cases which should be under medical supervision on the journey. The number may be calculated as 30 per cent. of the total number of wounded.

(4) Unfit for transport. About 20 per cent. of the total wounded; these men must be carried by hand to the nearest place where they can be left under proper medical care.

The first and fourth groups should not require any wagon transport; the second may be assigned to local or improvised vehicles; while the third should, if possible, be conveyed in ambulance wagons.

Taking Cron's figures, requisitioned transport should be provided for 30 per cent. and ambulance wagons for 30 per cent. of all wounded. In European warfare, owing to the network of railways transport by road should rarely be necessary for more than a couple of days' march. On arrival at railhead a fresh selection becomes necessary.

Most of the patients in group 1 (fit to march) should be fit to return

to duty in about ten days ; these will be turned over to the Convalescent Depot, or if this is situated further down the line they can be dispatched by any kind of train available. A few will probably require hospital treatment and will be added to the sitting-up group. A certain proportion of group 3 (lying-down cases) will require to be admitted to hospital for rest and treatment before continuing the journey by rail. Of group 2 ("sitting-up") cases a large number will require lying-down accommodation in the train unless the journey is very short. Conveyance by rail should be estimated for 60 per cent. of the total number wounded, and in practice it will be found advisable to provide lying-down accommodation for half of this number.

The lying-down patients should be subdivided into :—

(a) Helpless patients. These should, if possible, be conveyed in properly equipped hospital trains.

(b) Partially incapacitated patients, *i.e.*, patients able with assistance to get up and walk a few steps, use a commode, &c., may be assigned to improvised ambulance trains.

The sitting-up group can be conveyed in ordinary railway carriages or in case of necessity even in open trucks ; it is only for the lying-down cases that special arrangements are required.

*The Improvisation of Ambulance Trains.*—Improvisation is meant to express the adaptation of ordinary railway carriages, vans and trucks for the conveyance of sick and wounded. The problem to be solved is a double one, *viz.* : (1) to accommodate as many patients as possible in each wagon and so accelerate the process of evacuation ; and (2) to make such arrangements as will ensure the maximum comfort possible during the journey.

The only wagons suitable for adaptation to ambulance work are covered vans which have not been used for the conveyance of horses or cattle, as in the time available it is impossible to thoroughly clean them for the conveyance of sick.

The methods which may be employed fall under two heads : (a) the use of apparatus ; (b) material available locally.

(a) *The Use of Apparatus.*—Some of these consist of a framework which can be taken to pieces so as to occupy very little space and permit of the wagon being used for the conveyance of supplies to the front ; when emptied the apparatus is set up and patients placed in two or three tiers lying on stretchers, the supports of which rest on springs to minimise jolting. The objections to this method are, however, numerous. To begin with, the apparatus is more or less expensive thus involving a large outlay. Again, it must be purchased and stored at some convenient spot ; the size of wagons varies, hence the apparatus may not fit the particular kind of wagon available ; it is sometimes difficult to lift the patients into position ; a supply of stretchers must be available. On the other hand, if successfully employed a maximum number of patients can be accommodated with a fair degree of comfort.

Other methods, instead of using a framework adopt the plan of suspending stretchers from the inside of the wagon. Zawadowsky's is the best known one in this country. The objections to Zawadowsky's method are that it requires a large supply of hooks, ropes, lashings and poles, together with a trained *personnel* to fit them up, which also requires some time ; the stretchers must be carefully lashed to prevent a side-to-

side swinging motion ; when fitted up this wagon only takes eight lying-down patients. When properly carried out a very fair ambulance train may be fitted up on this system.

Port's method consists in placing two pine poles across each end of the carriage about 6 ft. apart ; the ends of the poles rest in a "V-" shaped notch cut in a thick board nailed to the side of the wagon. The stretchers are suspended from the pole by very short lashings ; the poles have sufficient spring to largely neutralize the jolting. Three stretchers can be suspended at either end of the wagon and six more placed on the floor, so that twelve can be carried in each wagon. As in Zawadowsky's method, poles, boards and lashings must be provided beforehand, but they can be more rapidly fixed than the hooks and slings, four trained men being able to fit up a wagon in fifteen minutes.

The Italians use upright poles bolted into the carriage and carrying long arms on which the stretcher is placed. Another plan consists in fixing to the sides of the van wooden blocks cut V-shaped at the top, these take the outer handles of the stretcher, the inner being supported by slings attached to the roof of the vehicle.

If it is determined to use any of the above methods it is obvious that the material must be collected beforehand and a sufficient trained *personnel* must be ready to fit them up.

If no preparations have been made in advance patients must be placed lying on the floor of the wagon. An ordinary covered goods van will at most accommodate seven, three at each end and one opposite the entrance ; this leaves a very little space for an attendant and the necessary equipment.

To minimise the jolting and jarring of what is practically a springless wagon, straw, brushwood or other substance must be placed for the man to lie on. The quantity of straw required may be calculated at 10 to 12 lb. per patient. If preparations have to be made in a great hurry the straw must be simply spread out on the floor of the wagon. The objections to this, however, are that the man soon works his way through the straw and lies on the bare boards, while loose straw is most dangerous in case a stray spark falls on to it. The straw may be filled loosely into sacks, two per patient, this prevents it from spreading, but a sack is too narrow to lie on comfortably and it requires some time to fill them all. If blankets can be spared the straw may be rolled up in these, or failing anything else, it can be tied in loose bundles.

Stretchers resting on bundles of brushwood make a comfortable bed for a wounded man.

The officer directing the transport of wounded by rail must make himself acquainted with the following data, and arrange his plans accordingly :—

(1) How many sick and wounded have to be evacuated : (a) lying-down ; (b) sitting-up ; and to what destination, *i.e.*, how many hours' journey by rail.

(2) The quantity and kind of rolling stock available ; when will it be placed at his disposal and for how long.

(3) What material and *personnel* has he for adapting it to the needs of the sick, can this be done in the time allowed him.

(4) How long will it take to load up the train ; how many attendants will be required to accompany the sick.

In the original monograph formulæ are given for calculating times, *personnel*, &c., but a little common-sense would seem sufficient to meet the case.

C. E. P.

**German Army Medical Report for 1905-06.**—The following notes on the health of the German Army have been taken from the *Sanitäts Bericht* (A.M.D. Report) of the Prussian (includes Saxony and Württemberg) Army for the twelve months, October 1st, 1905, to September 30th, 1906.

The average annual strength for the period was 531,735. The number of sick remaining under treatment on October 1st, 1905, was as follows: In lazarett, 5,868; revier, 1,485; total, 7,353.

The admissions per 1,000 of strength for the whole army were as follows: lazarett, 195.5; revier, 344.3; lazarett as well as revier, 52.3; total, 592.0. This ratio is lower than that of the previous year by 38.8 per 1,000. There has been a constant diminution during the last twenty-five years, as shown by the average annual ratios for the previous five quinquennial periods. The principal decreases have been as follows: Influenza, 8.6; affections of air passages, 9.2; of the digestive tract, 12.0; skin and connective tissue, 4.4.

The active army comprised the following classes: 75,892 non-commissioned officers; 431,791 lance-corporals and privates; 10,001 one-year volunteers; 14,051 reserves of the standing army.

The years of service were as follows: 218,932 men were in their first year of service; 202,761 men were in their second year of service; 110,042 men had completed two or more years.

The number of sick for each class was as follows:—

Non-commissioned officers, 28,842 = 380.0 per 1,000 of their strength.

Lance-corporals and privates, 268,958 = 622.9 per 1,000 of their strength.

One-year volunteers, 9,041 = 904.0 per 1,000 of their strength.

Reserves of the standing army, 7,966 = 566.9 per 1,000 of their strength.

The high incidence among the one-year volunteers is especially noticeable.

The sick-rate by years of service was as follows:—

In the first year of service, 836.0 per 1,000 of strength.

In the second year of service, 425.4 per 1,000 of strength.

In men of more than two years' service, 413.8 per 1,000 of their strength.

The death-rate is the same as the previous year, and the average for the previous quinquennial period, viz., 2.0 per 1,000 of strength.

A comparative table is given, showing the ratio per 1,000 of strength of admissions to hospital, and to regimental sick-rooms, and of men who had been treated in the regimental sick-room and then admitted to hospital, for each army corps.

RATIO PER 1,000 OF STRENGTH.			
Admitted to hospital	Treated in regimental sick-rooms	Treated in regimental sick-rooms and admitted to hospital	
Average for whole army ..	195.5	344.3	52.8
Lowest ratio XVIII. Army Corps ..	148.6	257.7	33.5
Highest ratio I. Army Corps ..	246.1	481.9	87.5

The table of admission ratios by months for the year 1905-06 shows as usual that the greatest incidence (approximately 60.0 per 1,000 per month) occurs during the months January, February, and March.

The average daily sick ratio was 24.8 per 1,000 of strength.

The total number of men under treatment during the year was 322,160, and the total days of service lost was 4,806,692; the average number of days under treatment for each patient, taking hospital and sick-rooms together, was 14.9 days.

The average period spent by each patient in hospital was 24.7 days, and in sick-rooms was 7.6 days. This is about the same as the previous year.

The average number of days' service lost by sickness for each man in the army was 9.2.

The greatest number of admissions were for diseases in Group X., i.e., skin and connective tissue.

*Vaccination*.—233,813 men were vaccinated. Of these 209,771 were successful; 15,974 were vaccinated twice or three times, of these 8,042 were successful. Altogether, out of 233,813 men, 225,745 were successfully vaccinated—96.5 per cent. of the whole.

*Scarlet Fever*.—321 cases occurred—0.60 per 1,000 of strength; 9 died. The Guards Corps had the highest number of cases, viz., 57.

*Measles*.—277 admissions, with 1 death.

*Mumps*.—436 admissions, no deaths.

*Diphtheria*.—349 admissions, with 15 deaths = 4.2 per cent. The years 1905-06 and 1904-05 have a considerably higher incidence of diphtheria than any year since 1894-96. The 9th (Altona) and 10th (Hanover) Army Corps always show a much higher incidence than any other.

*Erysipelas*.—471 cases, with 9 deaths.

*Typhoid Fever*.—357 cases = 0.67 per 1,000 of strength, and 1.0 per 1,000 of all admissions, with 43 deaths = 8.1 per cent. This is a slight increase on the previous year. There has been a very marked and steady reduction in the incidence of typhoid, taking the average annual incidence in quinquennial periods since 1881. The greatest incidence is in the first and second years of service, viz., 43.1 and 39.5 per cent. respectively, of the total incidence.

A comparative table shows the incidence and mortality in the German, Austrian, and French and Italian armies. The incidence is much the lowest in the German army.

*Tuberculosis*.—Admissions, 995 = 1.9 per 1,000 of strength, with 120 deaths.

*Dysentery*.—162 admissions = 0.30 per 1,000 of strength, with 6 deaths. The great majority of cases occurred in the 1st Army Corps (Eastern Prussia).

*Epidemic Cerebro-spinal Meningitis*.—53 cases, with 30 deaths and 13 invalids. Most of the cases occurred in the winter months.

*Acute Rheumatism*.—3,133 admissions, with 7 deaths and 752 invalids.

*Mental Diseases and Mental Weakness*.—There were 610 admissions = 1.1 per 1,000 of strength, of whom 625 were invalided. The chart shows a regular and steady increase in the incidence in this group of diseases from 0.21 per 1,000 strength in 1874-75, to 1.1 in 1904-05 and 1905-06.

*Venereal Diseases*.—The admissions for this group of diseases numbered

10,293 = 19.4 per 1,000 of strength; this is the same as the previous year. The highest incidence, 35.8 per 1,000, was in the 12th (1st Saxon) Army Corps. Two-thirds of the admissions were for gonorrhœa and its sequelæ. The highest incidence was in the month of October, when the recruits join the colours.

*Attempted Suicides.*—Number 121 = 0.23 per 1,000 of strength; 65 were returned to duty, 17 died, and 42 were invalided. The total number of suicides and attempted suicides was 314 = 0.59 per 1,000 of strength. The total number of deaths due to suicide was 210, = 0.39 per 1,000 of strength.

The total number of deaths in the Army was 1,078 = 2.0 per 1,000 of strength. Of these 707 were due to disease, 161 to accident, and 210 to suicide, *i.e.*, 19.5 per cent (nearly) of the total deaths.

C. E. P.

**The Statistical Report of the Health of the French Army for the Year 1907.**—This report, which has been published recently, this year contains for the first time an appendix consisting of a series of diagrammatic charts showing the comparative incidence of disease in various armies, on the lines of the diagrammatic charts in the British Army Medical Department report.

In connection with these charts it is of interest to note that the compilers have carefully considered the differences in methods of presenting statistics in the reports of the various armies, and have come to the conclusion that these differences are not sufficiently important to prevent comparisons being made.

The differences noted are as follows:—

The German statistics do not include officers, cadets, N.C.O.'s under instruction, the imperial body-guard, and the invalids. In America the officers are included.

British statistics do not include officers. The figures given only refer to the troops serving in the United Kingdom.

Bavarian statistics are similar to the German.

The Austrian statistics include the Hungarian Army, and the troops in Bosnia-Herzegovina and officers; troops on furlough or detached are not included.

Belgium does not include officers.

The Spanish figures do not include officers, civil guard, or carabinieri.

The Italian returns do not include officers, pupils at the Military School or Military Academy, civilians in military employ, invalids, sick under observation or treatment at watering places.

The figures for Holland do not include officers, recruits found unfit for service, or placed in hospital under observation before commencing their instruction.

Russian statistics include the officers.

In the tables of mortality from all causes the British and American figures include deaths by accident and suicide. The Italian returns do not include soldiers who have died while\*absent on leave. The Russian returns do not include deaths occurring among the minor establishments of the Army.

Epidemic cerebro-spinal meningitis is not given separately in the English and American returns.

The diagrammatic charts show the ratios per 1,000 of strength of the

following armies, viz., French, German, American, British, Austrian, Bavarian, Belgian, Spanish, Italian, Dutch, and Russian for the years 1903, 1904, 1905, and 1906. The Italian and Dutch returns are not included in the years 1905 and 1906, and the Spanish are not given for 1906. Separate charts are given for each of the following headings :—

(1) Deaths from all causes. In 1903 the French troops in Algiers and Tunis had the highest ratio, viz., 9.53, closely followed by the American army with 9.30. These two forces stand highest in all four years, although in 1906 the ratio had fallen to approximately 6 in each case. Germany has the lowest ratio, viz.: 1.20 in 1903, rising to 2.0 in 1906, in which year the Bavarian and Belgian armies were somewhat lower.

(2) Influenza. From 1903 to 1905 inclusive the American army had the highest admission ratio, in 1906 the Russian army occupied this position. The Austrian army in all four years had a much lower admission ratio than any other army.

(3) Deaths from influenza. The French and Spanish armies show the highest ratios for each of the four years.

(4) Measles. In 1903, 1905, and 1906 the French army had a much higher admission-rate than the others. In 1904 the American ratio was highest.

(5) Deaths from measles. In 1903 and 1905 France and Spain head the list, and in 1906 France again shows a much higher ratio than the other armies. In 1904 the American ratio is highest, and next to this the Spanish.

(6) Scarlet fever. France occupies the highest position on each chart.

(7) Deaths from scarlet fever.

(8) Admission-rate for mumps. France, Italy, and America occupy the highest positions.

(9) Admission-rate for small-pox. Spain, Italy, and America had the highest ratios.

(10) Deaths from small-pox.

(11) Admissions for diphtheria. France occupies the highest position.

(12) Deaths from diphtheria.

(13) Admission for and deaths from tubercle of lung. Spain shows the highest ratio.

(14) Pneumonia, admissions for. The Bavarian army had the highest ratio in all four years.

(15) Epidemic cerebro-spinal meningitis, admissions for, in 1904, 1905, 1906. The Bavarian army heads the list; in 1903 the Italian ratio was slightly higher.

(16) Deaths from cerebro-spinal meningitis.

(17) Rheumatic fever, admissions for.

(18) Typhoid fever, admissions for. The French army in Algiers and Tunis had from two to three times as many admissions as any other army.

(19) Typhoid fever, deaths from.

(20) Admissions for dysentery. The American army shows a much higher ratio than any other.

(21) Dysentery, deaths from.

(22) Malaria, admissions for. The American and Algerian-Tunisian ratios are much the highest.

(23) Admissions for gonorrhœa. The American ratios are by a long way the highest. The British being a good second.

(24) Soft chancre. The American ratios are highest, the Spanish and Italian coming next; Britain occupies the fourth place.

(25) Syphilis, admissions for. The American and British compete for first place, the Austrians being third.

(26) Erysipelas. Spain occupies the highest place on the chart.

C. E. P.

### Army Medical Report of the Russian Army for the Year 1906.—

A *précis* of the above report is given in the *Deutsche Militärärztliche Zeitschrift* of December 5th, 1909. The following points are worth noting:—

*Personnel.*—The establishment on January 1st, 1906, was as follows: Medical officers, 3,684; pharmacist officers, 240; pharmacist feldshers, 4,958; troop feldshers, 3,767. The *personnel* actually serving was below the authorised strength.

On January 1st, 1906: By medical officers, 270; pharmacist officers, 4; pharmacist feldshers, 1,184; troop feldshers, 784.

And on January 1st, 1907: By medical officers, 520; pharmacist officers, 3; pharmacist feldshers, 1,329; troop feldshers, 1,871.

The proportion of medical *personnel* to the rank and file was as follows: 1 medical officer to 423 men, 1 pharmacist to 5,714, 1 feldsher to 170.

On January 1st, 1907, the reserve medical *personnel* consisted of: 5,655 medical officers, 508 pharmacist officers, 87 class feldshers, 11,590 pharmacist feldshers, and 10,647 troop feldshers.

### Health of the Army.

		Admissions	Invalids	Died of disease
1905	..	397.4	45.1	3.76 per 1,000 of strength
1906	..	415.9	39.8	3.13    ,,        ,,

The principal increases were for syphilis and malaria. The following conditions are noted as contributing to the increase:—

- (1) Insufficient accommodation in barracks.
- (2) Bad sanitary conditions in many garrisons and want of supervision over prostitutes.
- (3) Insufficient facilities for washing and the deficient heating of barrack-rooms.
- (4) Poor physique of the year's levy, many of whom were suffering from trachoma and venereal disease.
- (5) The large number (one and a half the normal) of recruits.
- (6) Heavy guard duties, and in consequence of civil disturbances, frequently under inferior housing and feeding conditions, as in villages and private estates.
- (7) The necessary employment of civil surgeons who were not acquainted with military requirements.
- (8) The high incidence of scurvy among the troops returning from the war.

*Incidence of Disease.**(a) Officers and officials.*

Admitted to sick list	..	..	22,786 = 4.36 per 1,000
Died of disease	..	..	387 = 6.45 ..
„ by accidents	..	..	75 = 1.44 ..
„ by suicide	..	..	142 = 2.7 ..

*(b) Non-commissioned officers and men (exclusive of out-patients).*

Admitted total — 568,009, of these 44,827 were treated in barrack sick-rooms, and 523,128 in hospitals of various classes.

Out-patients 3,662,776, who were seen 8,058,625 times.

The out-patient ratio was equal to 2,682.1 per 1,000 of strength.

The strength of the army in 1906 was 1,365,634, the constantly sick-rate was 28 per 1,000.

The total loss for the year was 5,249 by deaths, and 54,307 invalided.

Typhoid	Admitted	Died	Invalided per 1,000
In 1897	8.4	1.37	0.9
„ 1904	3.8	0.62	0.8 (the lowest ratio for the decennial period)
„ 1906	5.6	0.9	1.5

*Tubercle of Lung.*—Admitted, 2.8; died, 0.37; invalided, 2.0 per 1,000.

*Venereal Diseases.*—Admitted, 62.6 per 1,000, an increase of 3.4 per 1,000, mainly due to soft chancre. There has been a steady increase since 1900, when the ratio was 42.1 per cent.

*Sudden Deaths.*

Due to disease	..	..	..	55 officers	160 men
„ accident	..	..	..	75 „	788 „
„ suicide	..	..	..	142 „	182 „
				272	1,135

*Invaliding.*—The total number was 54,307 men — 39.8 per 1,000 of strength.

*Recruits.*

42.1 per cent.	were found fit.
57.6 „	were found unfit.
0.3 „	died.

The total number of recruits enrolled was 433,177; 8.4 per cent. of these were rejected.

*Civil Hospitals and Military Convalescent Homes.*—28,714 officers and men were admitted during the year.

A number of improvements were made in military hospitals, the principal ones were the provision of dental X-ray and operating rooms, chemical and bacteriological laboratories, disinfecting appliances, and baths.

*Sanitätsstationen.*—The number of patients was as follows:—

In the sanitätstherapeutischen stationen	..	1,590 officers, 3,401 men.
„ sanitätshygienischen	..	144 „ 436 „
„ eye stationen	..	2,992 „

The two leprosy stations, Chelm and Ter, had 44 patients remaining on January 1st, 1906, 25 admitted, 3 discharged, 8 died, and 58 remaining on January 1st, 1907.

*Clothing.*—An increased allowance of bedding was sanctioned.

*Underclothes.*—Each man will in future receive three shirts, three pairs drawers, three handkerchiefs, three pairs socks, and two towels. The money allowance for maintenance of boots has been increased to five times the former rate.

## Correspondence.

### FATAL COCAINE POISONING.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

DEAR SIR,—Nearly eighteen years ago I saw a death at the Royal Infirmary, Dublin, after painting the raw surfaces resulting from removal of tonsils; 20 per cent. solution of the drug was used.

I have always heard that the urethral mucous membrane absorbed cocaine with great rapidity, and I should personally fear to use a stronger solution than 1 per cent. in this region.

I think the systematic use of adrenalin with cocaine is also desirable in order to retard absorption.

I am, &c.,

Paris,  
May 5th, 1910.

F. J. W. PORTER,  
Major R.A.M.C.

### A PHARMACOPŒIA FOR MILITARY HOSPITALS.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

DEAR SIR,—I think Major Wade-Brown, in his letter on this subject, makes a rather sweeping indictment of his fellow-officers when he says that few know what they are prescribing when ordering stock mixtures; but if he is correct, would a more extensive Pharmacopœia for military hospitals tend towards a better acquaintance? So long as our dispensers are required to pass an examination which is recognised by the Pharmaceutical Society, I think it would be a great pity to limit the scope of our officers in writing prescriptions, and of our compounders in making them up.

I have had a long experience of these examinations, and have noticed a lamentable ineptitude in the manufacture of pills, which I can only attribute to the vogue for 'tabloids' which has sprung up of late years.

Our officers have not only to treat soldiers, they have also to attend officers, their wives and families, and nothing looks so bad as ordering a stock mixture for these patients.

With regard to the latter part of his suggestion, to add appendices on various subjects, I do not think he has mentioned one which any

informed officer of our Corps could not put his hand on at a moment's notice in the various books of regulations, &c., which are in the possession of, and presumably read by, the owners.

There seems to be a tendency nowadays to spoon-feed the young officer; but, if he is wise, he will decline such unsustaining nourishment, and go to the fountain-head for information which will be a stand-by in future examinations as he climbs higher in rank.

In my opinion stock mixtures should only be used in medical inspection-rooms for treatment of sick in barracks, and for a certain class of case in hospital which does well on routine treatment. Directly a man grows really ill, the stock mixture becomes a danger.

I am, &c.,

T. DU B. WHAITE,

*Lieutenant-Colonel R.A.M.C.*

*Royal Arsenal, Woolwich,  
July, 1910.*

### STAFF RIDES.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—In an article on Staff Rides which appeared in the July number of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, the writer asked for opinions on some of the points mentioned therein. It is rather a pity the writer did not explain more fully the point in which he and certain Staff Officers differed, however, the following are a few remarks I would make in answer to his courteous invitation.

On p. 66, it is stated that "No. IV. Field Ambulance less *one* bearer division, &c., &c.," and "*One* Bearer Division of No IV. Field Ambulance will march with the advance guard." As there is only one Bearer Division with a Field Ambulance, I should like to know who approved of this specimen order? No doubt a Bearer Sub-division was meant. I think the writer might with advantage have enlarged upon these specimen orders and given examples of drafts and orders issued by the D.M.S., and the D.D.M.S., also specimens of requisitions for men horses, transport, stores, buildings, &c., &c. As regards the D.D.M.S. officers often forget that A.M.O's. of defence troops are not under the orders of that officer and the I.G.C., but under the command of the Officer Commanding Defences and the D.M.S.

It is not, however, the issuing of draft orders and Corps Orders that seems to perplex officers, but to whom the A.M.O. of a Division or Officer Commanding a hospital on the Lines of Communication should apply when they wish to evacuate field ambulances and hospitals, the former should, strictly speaking, communicate with the D.M.S., the latter with the D.D.M.S., but A.M.O's., especially A.M.O's. of defence troops,

more often save time by communicating when possible directly with the D.D.M.S., informing the D.M.S. of their action.

As regards the selection of Collecting and Dressing Stations, I quite agree with the writer that these matters should be left more in the hands of the Officers Commanding Field Ambulances, these Officers know better than the A.M.O. (especially in Indian warfare where brigades are often miles apart) where they are most required. I have pointed this out several times before. The A.M.O. knowing the Divisional Commander's intentions, might say where the Field Ambulances are likely to be; this and no more should appear in operation orders, the rest should be left to the Officers Commanding the Field Ambulances who would select sites and inform Medical Officers in charge of units of their position. There seems to be some dispute about inserting the intentions of the Divisional Commander in Corps Orders. Medical Units are more apt to fall into the enemy's hands than other bodies of troops, and if the Officer Commanding a Medical Unit held a copy of the D.C.'s intentions it might give the whole show away. Nothing should therefore appear in Corps Orders respecting the intentions of the Commander and the disposition of troops without being first censored by the General Staff; at any rate, only the movements of the troops that a Field Ambulance accompanies or of the troops in the area in which the Field Ambulance is to work should be made known to the Officer Commanding a Field Ambulance, and this should be attached as a separate slip to the A.M.O.'s Corps Orders, or the A.M.O. might write *his* intentions embodying some of those of the Divisional Commander's.

It is with regret one still sees officers, especially senior officers, writing about "A.M.O. of a Brigade," and "D.M.S. of the Lines of Communication," whilst others think that the Senior Medical Officer of a Brigade is a separate appointment and not held by the S.M.O. of one of the units composing the brigade. Another officer quite recently talked of "Field Hospitals"; no doubt he had lately arrived from the East and was a bit mixed as regards Medical Units, a pardonable mistake as matters exist at present. But what is not so excusable is the manner in which some Officers write their orders, they forget to block type their towns, number their paragraphs, affix date and the hour of despatch, and mix up matters for insertion in Operation Orders and matters for Corps Orders in a hopeless fashion.

In conclusion, I would again ask the writer of the article in question, to state plainly and exactly the points in which he and the Staff Officers differed, they might prove instructive to many of us, but as far as I can see there is very little in his article to which anyone could possibly take exception.

I am, &c.,

*Military Hospital, Cork,  
July 18th, 1910.*

J. T. WADE-BROWN,  
*Major R.A.M.C.*

## INDIAN MEDICAL GAZETTE.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—The July number of Volume VIII. of the *Indian Medical Gazette* is wanted to complete the series in the Library of the Royal Army Medical College. It has been ascertained that this number is "out of print," and the Library and Journal Committee of the Royal Army Medical Corps would be glad if any officer, possessing a spare copy of this volume, would present it to the Library.

The copy should be forwarded to me at the War Office.

I am, &c.,

War Office,

July 22nd, 1910.

B. H. SCOTT,

Major R.A.M.C.,

Hon. Sec., Library and Journal Committee.

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## A SURGICAL WEEK-END IN THE SIERRA LEONE PROTECTORATE.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Would you kindly allow me to explain that in my paper on "A Surgical Week-end in the Sierra Leone Protectorate," I had no intention of adversely criticising the medical arrangements at Moyamba, as made by the Colonial medical authorities. My objects were to show the amount of surgical work which is available to a keen operator, and also the fact that elaborate operating theatres and skilled assistants are not absolutely necessary for the performance of good work. Dr. Jackson Moore's work at this station during the past year affords ample proof that it is possible to make very excellent bricks with a minimum of straw, and one also knows the absurdity of expecting too much in every small station in the Protectorate.

I am, &c.,

Paris,

July 24th, 1910.

F. J. W. PORTER,

Major R.A.M.C.

Journal  
of the  
Royal Army Medical Corps.

Original Communications.

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MEDICAL HISTORY OF THE SOUTH AFRICAN WAR.

BY LIEUTENANT-COLONEL R. J. S. SIMPSON, C.M.G.

*Royal Army Medical Corps.*

*(Continued from p. 34, vol. xv.)*

(b) The actual conditions met with in the field, and the difficulties to be overcome, are shown in the following extracts from the Report of the Committee on Field Sanitation (assembled after the conclusion of the war), of which Colonel (now Surgeon-General) F. W. Trevor, C.B., was President, and Lieutenant-Colonels J. Meek and R. Caldwell members.

“(i) *Conditions on Trek.*—The men for the most part lived and slept in the open; no tents were provided. Shelters were made by stretching a blanket over a rope supported by a rifle or a stick at each end, over the shaft of a cart, or under a wagon. Two men generally joined in making a shelter, and sharing their blankets. Each man was allowed two, and by sleeping together, they kept each other warm and economised the blankets. There can be little doubt that this practice was responsible for the spread of disease, probably enteric, and certainly skin diseases and vermin.

“Although it was very difficult for the men to keep themselves clean, there were very great differences in regiments as to the degree of dirt and infection with vermin. Mounted Corps, as they were more constantly on the move, were undoubtedly the worst in this respect. The Infantry and Royal Artillery, when employed guarding the railways and lines of blockhouses, had more opportunities of washing. This want of cleanliness probably contributed to the

spread of enteric fever by direct contact, caused a certain amount of inefficiency from skin diseases, and aggravated veldt sores.

"(ii) *The Condition of Columns while Refitting.*—It must be admitted that the men looked upon the time spent refitting as a holiday, and possibly indulged their appetites rather freely, and this no doubt was one of the causes which led to the increased sickness noticed among the men after again starting on trek. The officers were naturally reluctant to turn their men out for fatigues (when enjoying a well-earned rest) to dig latrines and drag away dead animals and filth. The consequence was that the camping grounds round stations like Standerton or Bloemfontein, where columns were arriving almost every day, became very foul and were a source of great danger. Latterly no column was allowed to camp within a certain radius, generally three or four miles outside the station.

"Camps were occasionally pitched on the sites of old latrine trenches, and no doubt the dust and flies in such camps were responsible for much of the enteric fever."

[Note.—This applies of course to the camps of moving columns only; standing camps were on specially-selected areas. The nuisance, one may say the danger, caused by the arrival of these columns cannot be exaggerated. In addition to those points brought out in the Report, special attention may be called to the presence of large numbers of horses and transport animals and the large native establishment. At some stations, special gangs had to be employed to clean up after the departure of a column. It was quite impossible to get the irregular corps to pay any attention to sanitation.]

"(iii) *The Purification of Water in Camp and on the March.*—In standing camp, during the latter part of the campaign, all water was boiled; in hospitals and messes Berkefeld filters were also used. If boiling is properly carried out it requires a large quantity of fuel, which is a great difficulty in a treeless country like South Africa. Separate vessels must be kept (extra cooking pots were supplied, to be kept *solely* for this purpose), otherwise the water, if boiled in cooking pots, is greasy and unpalatable. There is no doubt boiling is the only method suitable to active service, but it can only be carried out when in standing camp. It is impossible to carry vessels and firewood, or to find time on the march, when the men fill their bottles as best they can. From want of sufficient animals, water carts had to be taken empty on the march, and they were only used to supply troops when in camps. The habit of drinking

water on the march is a bad one, and might with practice be controlled. It is often due to the use of strong tobacco. It was found practically impossible to prevent the men drinking foul water on the march.

"Great care was taken to select the best possible source ; medical officers went on ahead of the column to select the place for filling the water carts. Sentries were posted to prevent animals and men, especially natives, fouling the supply, and a European was placed in charge of the carts to see that they were filled at the selected spot, where a pump was fixed by the Royal Engineers. A long hose was used to raise the water, and deliver in water-carts. All this was well carried out in camp, or when the columns arrived on the camping ground sufficiently early, but frequently it was after dark, and possibly pouring with rain, when the carts were probably filled at the nearest place. Then as fires and lights were not allowed if the enemy were in the vicinity, it was impossible to boil water, cook food, or dig latrines.

"Towards the end of summer, water became scarcer, and the choice of camping ground more restricted, consequently the same ground was repeatedly occupied and the surroundings became more contaminated. Diseased and exhausted animals invariably make for water, and not having strength left to extricate themselves from the mud, lie down and die, and where the banks of the spruit are steep the mortality is very great. The Modder River in particular was full of the carcasses of animals. Another great cause of contamination is the natural inclination of human beings, both black and white, to seek seclusion while defæcating, and as South Africa is an open treeless country, the spruit offered the most convenient cover. The consequence was that when it rained, all the filth was washed down into the deep, stagnant pools, which contained a concentrated solution when the water ceased to flow at the end of the dry season. It was from these pools our drinking water was drawn, so it was little wonder that at this season of the year enteric fever broke out.

"The water in most South African rivers holds a very large amount of mud in suspension, so much so, that until after it has been treated with alum, or some means taken to clear it, no filter is of any use, as it becomes clogged at once. In skilled hands the Berkefeld filter was very useful, but it is\*hardly suited to the rough usage of active service. The cylinders were always getting broken, and had to be so frequently cleaned that their efficiency probably became impaired. In hospitals and camps where the filters could

be looked after and properly treated they did good service; but in the field they were of little use. It was impossible with the means at hand to filter water for a large number of men.

"The men were encouraged as much as possible to drink tea or coffee, and some good might be done by giving an increased ration of tea, for the soldier will always drink tea if he can get it in preference to water.

"The water-carts were frequently cleaned out and disinfected. The sources of water supply in permanent camps were carefully protected, in some instances by a barbed-wire enclosure, and frequently by a guard.

"(iv.) *Disposal of Excreta*.—Trenches were cut on arrival in camp under regimental arrangements, and were filled in before starting next morning, but, as before stated, this depended a good deal on what time the troops marched; if before daylight, it was often neglected. When troops halted for a few hours at mid-day no sanitary arrangements were made. Large tracts of country must have become highly infected. The Boers, of course, made no attempt whatever at sanitation, and the field hospitals were always carrying along a certain number of enteric cases, whose excreta were scattered along the line of march. It must often have happened that troops camped on the very spot where a field hospital latrine had been previously located, and in this way sudden outbreaks can be accounted for. Latterly, columns were kept as far away as possible from the towns when drawing supplies, so as to avoid further contamination of the ground, and also to get into clean ground themselves.

"Deep pits were dug alongside the kitchens, into which all refuse was thrown, and subsequently buried with chloride of lime when obtainable. Stable refuse was burnt, and also the carcasses of dead animals when they were dry. The carcasses were so numerous and the ground so hard that it was not generally the custom to bury them. In some instances destructors were improvised, and where plenty of stable refuse was obtainable they worked well. The sun in South Africa is, however, the best of all disinfectants, and if carcasses were ripped up freely they very soon dried, became odourless, and burned well. Left exposed to sun and wind a man's excreta dries up and disappears altogether in twenty-four hours on the veldt, but not in damp, shaded spruits. The soil of South Africa is remarkably sterile in the matter of organic life.

"In connection with latrines and filth generally the question arises as to the part played by flies in spreading disease. Medical

officers in the Army are unanimous in thinking that they are responsible for a great deal of the diarrhoea and enteric fever. The presence of many flies is a certain indication of a dirty camp, and they have been traced from the latrines to the cook-house and ration stand. Quicklime freely sprinkled about is very efficacious in reducing their numbers, and in tents Keating's powder is deadly, especially when used at night.

"In connection with the removal of excreta, it must be remembered that no native establishment existed, except in large permanent camps, and everything had to be done by the men themselves. Urine was removed in cans and tubs when in camp, but at night the men doubtless micturated all over the ground.

"(v.) *Zymotic Diseases*. — Enteric fever was almost the only disease of the type that calls for notice; it was the only fever seen, except in some parts, where, as at Koomati Poort, the climate was tropical and malarial fevers prevailed.

"Where large numbers of men are simultaneously attacked, the cause is probably to be found in the water; but in the columns trekking it was generally noticed that the men began to sicken a few days after leaving the town where supplies were drawn. It is now thought that enteric fever was not so frequently contracted on trek as at the depôts where thousands of men were constantly coming and going. The longer out on the veldt the healthier and better the men were.

"Where a whole regiment was using the same water-cart it can hardly be supposed that the odd cases of enteric fever could be due to water; on the other hand these can be accounted for by flies walking over the food after a visit to the latrines.

"Where large numbers of flies were destroyed in tents and subsequently trodden under foot, a horrible foetid odour of putrescent matter was noticed. No conception of the vast number of flies can be formed by ordinary experience; it was common to see the inside of tents black with them, and so was the food, if not protected by sacking, as was recommended by the medical authorities."

The following account by Lieutenant-Colonel Coutts, R.A.M.C. (in continuation of that portion already included under the head "Modder River"), gives an idea of what happened throughout the campaign, and shows how local conditions influenced the incidence of disease:—

"To follow the fortunes of Lord Methuen's column—this marched to Kimberley about a week after the relief of that place. Enteric fever here was of the same type as that described at Modder

River. The water supply at Kimberley was believed to be good, and the dry-earth system of sewage removal was carried out, but enteric fever continued as rife as before among the troops encamped on Newton Common.<sup>1</sup>

"Lord Methuen's column, now reduced to two brigades, with a force of Imperial Yeomanry and a proportion of Royal Artillery, left Kimberley on April 2nd, 1900, and marched to Boshof, a distance of 40 miles, where it remained until May 14th. Here the two chief diseases were still enteric fever and dysentery, the latter becoming distinctly more common. Two temporary hospitals were established here; one in the schools contained eighty beds, and the other in the court-house twenty beds. A small proportion of these was set apart for wounds and dysentery, but about ninety were constantly occupied by cases of enteric fever. In addition to the sick treated locally, the field hospital records show that 363 sick were sent to the base during this period.

"The local conditions in Boshof seemed much more favourable to health than was the case at Modder River. The veldt was covered with grass, and although there was dust, it was never the trouble it was at Modder River.

"The water ran clear and sparkling from a large basin tapped by tunnels driven through a band of hard rock.

"There was a distinct falling off in the severity of the enteric fever cases consequent on the lowering of the temperature. A good deal of rain fell during the time the force was encamped at Boshof, and the nights became cold. The temperature taken on the grass registered 44° F. at 4.30 a.m. on May 1st.

"Lord Methuen's column left Boshof on May 4th and marched by Hoopstad, Bothaville, and Kroonstad to Lindley. At Hoopstad temporary hospitals were organised for about one hundred cases, of whom about twenty were believed to be enteric. At Bothaville about twenty cases, fever and dysentery, were left behind. Fifty sick were left at No. 3 General Hospital, Kroonstad, on May 30th, and the force marched for Lindley, which was reached on June 3rd. From this place a convoy of sixty sick was despatched next day, and on the 5th Lord Methuen, with the 9th Brigade, marched for Heilbron, leaving thirty-seven behind, and one brigade to hold the place. Here, by June 12th, fifty cases of enteric fever were under treatment, and it was noted that the disease was less severe in

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<sup>1</sup> Enteric fever was common in Kimberley before the War, and was prevalent among the civil population before the relief.—R. J. S. S.

character, fewer cases presented acute toxæmic symptoms, although diarrhoea, abdominal distension, and spots were still frequent. The water supply was derived from the river, and was therefore open to suspicion, and although there were dust storms they were slight compared to those at Modder River. A convoy of ninety-nine sick and wounded was sent to Kroonstad on June 30th. From Lindley the Brigade marched on July 2nd to Bethlehem to join the force hemming in Prinsloo's commandos. At Bethlehem the sanitary conditions were no better than in the other towns passed through. The water supply was derived from the river, and was full of suspended matter, but the typhoid season was over and it ceased to bulk largely in the hospital returns."

(10) *The Seasonal Distribution of Enteric Fever and Dysentery*.—The practical limitation of enteric fever to the season of the summer rains has been already spoken of. As this season varies somewhat throughout South Africa, the outbreaks are not simultaneous but follow one another, beginning in Natal. Hence the aggregate of cases over South Africa will show a longer period of considerable prevalence than in any single area.

The seasonable distribution is not of sufficient importance, complicated as it has been shown to be, to justify the enormous labour of distributing the actual admissions. But records exist, compiled during the war for administrative purposes, of the number of cases remaining in hospital week by week during 1901 and 1902. From these the average number in hospital for each of the seventeen months has been calculated, and the ratio per 1,000 of the mean of the strength of the corresponding month and that preceding has been plotted in figure 11. This gives a sufficient approximation to the relative monthly admission rates.

The maximum is seen to occur in February, the minimum in October; this last is probably artificially delayed, as compared with the admission minimum, by the decreasing number of admissions and the greater available accommodation in the hospitals diminishing the rate of invaliding. The maximum in 1902 was greater than that in 1901; this may be related to the greater number of troops sent from England during the summer 1901-2. Another point that has to be noted is the more rapid fall in 1902—equal ratios are nearly two months earlier in the latter year, and this rapid fall continued after the period recorded here. It was not due to any alteration in the war conditions, and though the sanitary conditions were probably rather better than in the previous year, this earlier decline suggests a limitation of the spread of

disease owing to the large proportion of the force which had been immunised by previous attack. It may have been due to changes in the working of the hospitals, for at this time, owing to the wide sweeping movements, accommodation had to be reserved at a great many different points, and evacuation and invaliding were somewhat pressed.

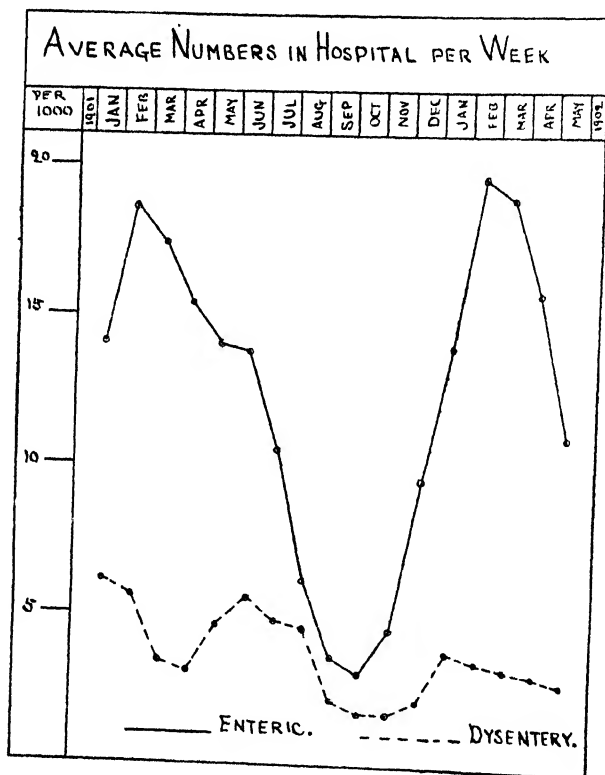


FIG. 11.

The contrast between the enteric fever curve and that for dysentery is interesting. Dysentery, as has been already stated, shows a very much smaller prevalence than enteric fever (85.8 as against 129.9 over the whole War), and less seasonal variation. The actual number of *fresh attacks* as contrasted with *admissions* to hospital is, of course, still smaller, and the shorter average duration of the case would also reduce the numbers remaining in hospital as compared with the cases of enteric fever. It may be

the case that the rise between May and June, 1901, was due to cold and exposure producing relapses as well as fresh cases. In both years the ratios fall from January to April—*i.e.*, during the warmer weather. But the figure shows on a larger scale what has already been pointed out—that dysentery tends to be limited in prevalence far more than enteric fever, and that its development is probably less determined by seasonal, climatic, conditions than that of enteric fever, possibly because of the lesser vitality of the effective agent outside of the body.

(11) *The Mode of Propagation.*—We have seen that in four large bodies of men, an *incubation period of the epidemic* of enteric fever occurred of about eight weeks duration—*i.e.*, more than twice the accepted maximum incubation period in the individual, and that this was independent of the environment of the troops concerned. What is the explanation of this incubation period, and in what relation does it stand to the hypotheses of the propagation of enteric fever?

Take first the hypothesis of water infection. There are two possibilities: (a) Specific contamination of the water supply prior to the arrival of the troops in the area supplied. This was possible in each one of these instances, most distinct in Ladysmith and Bloemfontein, possible at Modder River, and to a less degree in the Natal Field Army. (b) Specific infection of the water supply after the arrival of the troops by early, possibly unrecognised, cases, or by carriers among the troops. At Ladysmith this was certainly not impossible; at Modder River it was also possible, but in the Natal Field Army and in Bloemfontein at this early period, it could hardly have taken place.

It is difficult to see the mechanism in either of these two cases. In Ladysmith, and to a less extent at Modder River, one may assume pollution higher up stream, in the one case from the Boer Camps, in the other from Jacobsdal.

The difficulty in accepting an hypothesis of water infection (which applies to both cases) is the character of the outbreak, quite distinct from that sudden maturation of a large number of cases due to a general infection, so characteristic of the known examples of widespread water infection. One can only accept water infection as one of the modes by which the original cases arose in comparatively small numbers.

Take, again, the question of soil infection, in which, as in water, there are two divisions, before and after the arrival of the troops. Both hypotheses assume the existence of antecedent cases, but

soil infection would appear to demand a greater prevalence than water. In Ladysmith, all conditions were favourable to a wide-spread soil infection, which probably did in fact exist. In the Natal Field Army it cannot be assumed; at Modder River before our arrival it probably did not exist, but after December it must have existed to a considerable extent. In Bloemfontein it probably existed. So that we do not find an equality of conditions among the four groups, and the one hypothesis will not apply to them all. Soil infection must act more slowly than water; it acts indirectly through infection of the water supplies, or directly through dust infection of the food, or even possibly by inhalation. Both of these modes of action are determined by non-continuous factors, rainfall and wind. However important soil infection may be in maintaining an epidemic which has originated otherwise, it is difficult to conceive it as the agent transforming a small prevalence into a sudden epidemic.

During the South African War there were innumerable foci of infection, each of which probably gave rise to a greater or smaller number of cases dependent on the radius of action of each of these foci. Now if we are to assume that the outbreaks we have been considering were due to infection from without, we must assume (from the maturation of the greatest number of cases within a limited period) that the foci of origin were either of extensive radius (such as a water or possibly a soil infection), or while individually small, were very numerous, *and all specifically active about the same time but only over a period which must have been short*. It appears on the one hand that neither water nor soil infection will explain the mode of development of the epidemics, and on the other, that though innumerable foci were present and active, their activity is not known to have been especially greater at one and the same time, or limited in duration. So that none of these external causes suffice to explain the mode of development of these outbreaks.

There remains the theory of personal contact, using this term, as before, to include direct personal infection from close association, the infection of a commensal, and indirect infection through excreta. If this remains unchecked, the development must increase till all susceptible individuals within range are infected. The original case is capable of infecting a small number of individuals who are in close association with him, each of these cases can in turn infect a further number of individuals, and so the number of agents is constantly increasing. Where the group in association, through common life, common latrines and the like, is small, the result is

the so-called "company" outbreak. Now under ordinary peace conditions, there is probably no better means of spreading an infective disease than the life in common, such as the soldier lives, especially where the system for the removal of excreta wants the certainty of a water-carriage system. One has daily examples of this in the countries in which enteric fever is endemic—India and South Africa. On service, all the evil features of the life in common are aggravated: blankets, clothes, and the like become more or less common property, personal cleanliness is but a thing to hope for, the mode of disposal of excreta at its best is imperfect, as a rule it is haphazard; much more discipline in this matter is wanted. The detection of typical attacks in the early stage, still more the recognition of the atypical forms of infection, is extremely difficult; the men do not report sick early; if they do, it is almost impossible (even if it were desirable) to retain them under observation in the first line hospitals, and what is still more important, to take steps that such presumably infective cases shall remain harmless. Hence the range is only limited by the number of susceptible individuals in the force. This appears to have been the cause of the extraordinary prevalence in Ladysmith, while in Bloemfontein the range appears to have been unlimited, as the number of susceptible individuals exposed was continually receiving reinforcements from England.

Now the curves of development in these four groups certainly suggest a growth of this type—an auto-infection—while they do not appear to be explained by any theory of external infection of the mass.

The sequence of events, in the development and propagation of enteric fever and dysentery, appears to have been the infection of a certain number of cases from an external source and the growth of the infection from individual to individual throughout the group. The lesser prevalence of enteric fever and dysentery in the later stages of the war was partly due to the smaller size of the groups.

(12) *The Influence of Reinforcements on Prevalence.*—In a campaign of any duration the proportion of reinforcements will always be considerable. Reference to the tables on pp. 630-1, vol. xiii., will show the numbers sent out to South Africa at various periods.

The question of the relative susceptibility of men from various sources was raised at an earlier period. It has been shown (Army Medical Department Report, 1898, p. 502) that in Natal the admission-rate for enteric fever in 4,232 men from England was 39·3 per 1,000, in 3,223 men from the Cape, 33·2, and in 3,048 men

from India, 23·6 per 1,000—that is, the prevalence in Natal was inversely as the previous exposure to infection. But this protection of troops from India as compared with others has been seen to break down in the case of Ladysmith, where the majority of the men were “salted” by previous exposure. Similarly it has been shown that in India, at times of exceptional prevalence, the older men of longer service suffer, and diverge from the mean as much, if not more, than the younger men (Army Medical Department Report, 1906, p. 38). Against this, we have the greater liability of the younger, newly-arrived soldier to attack. In India between 1897 and 1906, 62 per cent. of the cases were in men under two years service, 75 per cent. in men under three; in Natal (1893-7) 61 per cent. in the first year, 19 per cent. in the second, or 80 per cent. within the first two years after arrival (Army Medical Department Report, 1906). Each of these statements really means, if the time of the trooping season be kept in mind, that given an endemic prevalence, the new arrival is usually attacked on the first opportunity.

Hence we had in South Africa two elements tending to increase the prevalence, the failure of the normal protection of the men of longer service under the stress of the campaign, and the constant inflow of men without any degree of natural protection. Inoculation, imperfect as the method then was, appears to have had some influence for good, both on prevalence and mortality.

These two elements, failure of protection among the men of longer service and the immediate susceptibility of the new arrival, are probably always effective in war, but the latter was exceptionally active in South Africa on account of the very high proportion of reinforcements.

(13) *Modes of Prevention.*—Of the two modes of propagation of enteric fever and dysentery, infection from without is mainly limited to water infection, direct through drinking water or aerated waters, and other prepared drinks. There seems to be no reason why with proper methods of filtration, or of sterilisation (which seem now attainable), and with a specific organisation for the supply of pure water (which now exists), the risks of infection from this source should not be rendered almost entirely negligible, provided that the scheme is supported by the individual action of every man of the force, or by the somewhat unfortunate and far less effective alternative, strict discipline. How far the possibilities of the scheme, which appear to be unlimited, will be realised in practice remains for the test of war to decide. It is, on the whole, more

likely to be effective where recognised tactical units of the regular forces are concerned than in the equivalents of the "columns" of the South African War, especially where irregular troops are employed.

There is also the possibility of infection from without through the occupation of infected towns, villages, or camps. If the necessity of guarding the force against infectious disease be recognised to be as important as that of guarding it against the other hazards of war, it should be possible to avoid this, except under unusual conditions. History shows that too great avoidance of possible risk from the enemy has not been infrequent, while, on the other hand, too little regard has been paid to the risk of infectious disease. It must, however, be remembered that in such a country as South Africa, routes and stages were usually determined by the river system—on the one hand for the sake of fords, on the other for the only available water supply—and under such circumstances, one force following another must often make use of sites that have already been camped on. There is, however, no doubt that great laxity, often inexcusable, existed in the marking of latrine trenches and rubbish pits.

Without attempting in any way to lessen the importance of the supply of pure water, there is, without doubt, increasing strength of opinion that the provision of pure water is only one, and possibly not the most important, element in prevention. One may, for example, contrast the practical disappearance of cholera from the British garrison of India with the continued prevalence of enteric fever. The provision and distribution of pure water is probably practicable if it receives the attention it deserves; the avoidance of infected areas should normally present no difficulties. But when we come to the prevention of infection from within—contact infection—the serious difficulties begin. These difficulties fall into two groups: first of all, it is difficult to secure your case at the earliest moment; next, having secured and recognised your case, comes the problem of how to deal with those who have been in contact with him. Take the easiest case of all, that of a unit, say a battalion, forming part of a brigade when things have settled down after the first confusion of the disembarkation, which is just about the time one would begin to look for the very earliest cases of enteric fever. Suppose one man of that battalion is infected from without. He forms one of a group of men who are associated in every possible action of their daily life. After malaise, lasting, perhaps, a week, and possibly some diarrhoea, he reports sick to the medical officer

of the battalion, by whom he is sent to the field ambulance, thence to the clearing hospital, and so to a stationary hospital on the lines of communication, where he suffers from, say, a normal attack of enteric fever. The medical officer of the battalion can hardly form a diagnosis that is of any value, he may note the case as suspicious. In the field ambulance little more can be done, cases cannot be retained there for observation, and so it is not until the patient has reached the stationary hospital that sufficient certainty of diagnosis can be attained to justify the measures which, irksome under peace conditions, become almost impracticable in the field—*i.e.*, thorough disinfection and isolation of the contacts.

Meanwhile, what has happened to the brigade? It has gone on; possibly fought an action in which the battalion lost heavily. Probably the group to which the patient belonged has been broken up and the individuals cannot be got together again, certainly the blankets and kit which were left behind when the patient went sick have been used by his associates. The result is that in many cases it is not possible to have any control over the men of the group, some of whom are probably infected, and like the first case are spreading infection broadcast. What can be done in such a case? Nowadays, with the case in barracks, we should all deal with it on the most stringent lines, evacuation of the room, disinfection of everything that can be disinfected, and quarantine of the men who were in the room. Suppose the simplest case, where the group has remained recognisable and available; disinfection of their kit is probably possible in some way or other provided there is time. But what is to be done with the contacts? Complete isolation short of sending them to hospital or special camp is not practicable.

The following measures are suggested for consideration:—

(a) A stringent adherence to the regulation that every man shall take the whole of his kit with him when he reports sick. For this the company officer should be held responsible. In all suspicious cases the whole of the kit should be disinfected, and it would be wiser where possible to deal with the kits of the contacts also.

This question of kit is rather complicated. Probably we shall not see again those enormous kits which many men possessed in the early days of the South African War (when the distribution of "gifts" was ill-regulated), which were a source of serious embarrassment to the hospitals. On the other hand, the normal service kit is small; after a little wear and tear, the man has probably only one set of clothing which is at all fit for use. Hence if his kit is to be disinfected, he must be accommodated somewhere while the

operation is going on. Also, for the same reason, the method of disinfection which is adopted must be one which damages the articles as little as possible; this appears to exclude certain rough and ready methods which are otherwise practicable if time allows. One cannot well boil garments if they are to be rendered too small for use. Time and the difficulty of replacing articles are the two obstacles in the way of extensive disinfection in the field. It appears, however, to be quite practicable to design a satisfactory method which can be carried out in the field ambulance.

(b) The provision of special latrines for that company in which the case occurred, these latrines to be specially looked after by the battalion sanitary detachment. The contacts at least to report to the N.C.O. of the detachment after using the latrine so that their excreta may be rendered harmless at once. A special issue of disinfectants for this purpose, and transport for it will be necessary. It is better not to trust to any general scheme for the disinfection of the latrines.

(c) A careful medical inspection of the company, and especially of the contacts. As regards the latter, their temperatures should be taken (best in the evening, if possible, and remembering the effects of exertion); a record of stools should be provided by the N.C.O. of the sanitary detachment. Any man who appears out of sorts should be put on the "contact" list. It is, of course, probable that such an inspection could not be carried out daily without a break, but there seems no reason why under ordinary conditions of war, an inspection which is of practical use should not be possible.

We have to be careful that our sanitary control shall not trespass upon what is after all the primary object of war—successful movement against the enemy, and up to a certain point, the risk of epidemic disease must be accepted as one of the ordinary risks of war. What we have to do is to reduce this unavoidable risk to the lowest possible. Wastage of the fighting line is, even apart from epidemic disease, always a source of anxiety, and under any circumstances, when a man is sent back from the fighting line it means the loss of his services for considerably more than the period which is covered by his disability. Hence it is not possible that any scheme, involving the loss of men from the fighting line, could be accepted unless it can be shown that such a removal is in the end beneficial—that is, that it maintains the fighting strength at a higher level than any other method.

That is our difficulty with regard to enteric fever; the infectivity

so long precedes the obvious disease,<sup>1</sup> the early diagnosis is so obscure, that infection has in all probability taken place before any one is aware of the existence of the infecting agent. If we can show that the immediate removal of the contacts, at least five men for every case, instead of temporising in the way suggested above, will cut short an outbreak, then it simply becomes a matter of proportional loss from the fighting line. But a short calculation will show that the loss so caused exceeds that resulting from a severe epidemic.

We have been given a sanitary organisation which should, with the concurrence of the individuals of the Army, enable us to maintain complete control over possible infection from recognised cases, *i.e.*, after their recognition. We must, it seems, develop a similarly complete scheme for the early recognition of suspicious cases. This involves two things, a more complete supervision of the men of the force who do not report sick, a matter which does not present insuperable difficulties, and greater care in relation to those doubtful cases of indefinite pyrexia, permitting none of them to be disguised under the term "pyrexia of uncertain origin," unless and until the most careful examination has failed to account for the condition. In the stationary hospitals, at least, the old rule should be followed in regard to prevention, which has been followed for many years in treatment—to consider every febrile case which remains unexplainable as one of enteric fever. It would probably pay in the end if every febrile case, however mild, however reluctant to go, were sent from the first line hospitals at once to those on the line where disinfection and sterilisation, as well as diagnosis, can be adequately carried out. In this way, though the loss to the fighting line might for the moment be greater than was absolutely necessary, we should certainly cut short the period during which the really infective case was spreading infection in the field, and so diminish the total loss. If it were possible in the field to distinguish the typhoid diarrhoeas from those due to unimportant causes, they too should be treated in this way. Contact infection is at least as important as water infection, and in one way more so, in that it demands the prior existence of an infective case which is, or should be, under our control. It is this control which is the vital point; in systems of

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<sup>1</sup> Simon in six cases found bacilli in the stools from one to twenty-five days. Conradi, eight to eleven days before the earliest symptoms.—*Klinisch. Jahrbuch*, t. xvii.

water protection we are insuring against a possible risk, in the elimination of early or atypical cases, we are ensuring the removal of a certain source of infection. The removal of acute cases of dysentery from the front is hardly less necessary, though here the question of contacts is less important, as the declared disease follows infection more rapidly.

The question of carriers is important. Although the proportion is small, yet the danger has been demonstrated repeatedly. As regards the Army, prior to mobilisation, every man who has had enteric should be retained under observation until it has shown whether or not he is a carrier, permanent or intermittent. The permanent carriers, irresponsive to treatment, are no longer fit for service. Where the danger lies is in the recruits, reserve men, possibly attacked in the interval of their service, and in the civilians, natives and others, employed in subsidiary branches, especially the transport. It is possible to deal with recruits on enlistment, and perhaps with mobilised reservists, though this seems difficult, unless it was arranged to accept a certificate of attack as rendering the man temporarily unfit until proved to be free from infection. As regards civilians employed, the matter is hopeless; it is the one avenue which we cannot close, usually we cannot pick and choose when we require their services.

We may by inoculation help our efforts against the entrance of infection by diminishing its activity after it has entered the body. This will probably not eliminate all possibility of infection, though it lessens the frequency and severity. But the detection and elimination of carriers, and inoculation, have no place in the field, they must be carried out without undue pressure before the troops embark.

(14) *The Result of an Admission for Continued Fever.*—Of the 57,684 cases of enteric fever admitted to hospital, according to our records,

(a) 8,022 or 13.9 per cent. died.

(b) 19,451 or 33.7 per cent. were invalided.

(c) 30,208 or 52.4 per cent. were discharged otherwise—i.e., (1) returned to duty, or (2) some other disease supervened, or (3) remained in hospital at end of record

Of the 33,033 cases of simple continued fever, 30,879 or 93.5 per cent. were discharged otherwise as shown above.

In a large proportion of the cases originally admitted as simple continued fever, the disease was changed to enteric fever later on, and in compiling the consolidated returns, such cases have been eliminated and ~~shown under the heading of enteric fever~~

The important item under both headings is the number returned to duty; the cases in which the disease was changed or which remained in hospital at the close of record are comparatively few.

We have, then, something like 30,000 men returned to duty after having suffered from enteric fever, and, according to recent work, among that number there were probably 3 to 4 per cent. who were carriers, say about 1,000 men. To these must be added the carriers among the large proportion of the invalids who returned to South Africa and rejoined the fighting line, and, further, a proportion of the cases of simple continued fever returned to duty, which together might add another 600 to the 1,000 carriers mentioned above.

These form an important number of infective foci. It is not possible to trace their influence on the general prevalence during the War. This total was, of course, not thrown into the force at a definite time, but increased *pari passu* with the development of the general prevalence. But it raises the very serious question of the disposal of cases of enteric fever on Service after their recovery.

The total corrected admission-rate for enteric fever among the warrant and N.C.O.'s and men of the whole force was 129.9 per 1,000 of strength. Converting the percentages shown above into ratios per 1,000 we have:—

Died..	..	..	..	18.06	}	129.90
Invalided	..	..	..	43.78		
Discharged otherwise	..	..	..	68.06		

Allowing 8 per 1,000 for change of disease and remaining at the close of record, we have somewhere about 60 per 1,000, of whom some 3 to 4 per cent. are carriers, something between 1 and 2 per 1,000 of strength.

The invaliding of every man who had suffered from enteric fever, to the zone of the home territory, would solve the problem from the sanitary side, it would admit of the elimination of the permanent carriers, and of the comparatively early return to the fighting line of those who were entirely free from infection, and later of those who were curable. But the loss caused by this "roast-pig" method is outside the possible limits. The loss to the fighting line in South Africa from death (permanent) and invaliding (temporary) was over 60 per 1,000. We cannot afford this enormous increase in the temporary loss for the sake of insuring the elimination of the relatively small number of cases infective after recovery.

What other possibilities remain? It is quite certain that the bacteriological investigation of recovered cases of enteric fever cannot be carried out in the zone of the field army, where, how-

ever, these cases should not be until they are shown to be harmless. It does not seem impossible, on the other hand, to carry out such an examination on the lines of communication, where there are large hospital establishments, and laboratories which should be adequate for these investigations. It would probably not be impossible to arrange for quarantine stations for the segregation of those enteric cases who are fit to return to duty, provided they are non-infective. The whole establishment of these stations (except the medical officers and a small permanent staff, to be responsible for the equipment and the like) would be provided from the officers and men in quarantine.

In South Africa the average number of days under treatment of a case of enteric fever was fifty-six. The average time required for the examination as to infectivity is hardly determinable so far if it is decided to exclude the intermittent carriers, which is, of course, desirable, but probably not practicable. Taking as a practical minimum the elimination of those found infective after not more than two examinations, the total absence from the ranks would amount to about ten weeks—that is, quarantine for examination practically increases the temporary loss by 25 per cent.

The material advantage of following such a course has to be considered. Unless we are prepared and able to maintain other conditions at their very best—unless we can eliminate the other and more frequent sources of infection, especially those arising from early cases and those still in the stage of incubation—it seems hardly possible to put forward the necessity for this elimination of carriers. Certainly under the conditions in South Africa it is difficult to see that the gain would in any way have counterbalanced the additional loss of men in the fighting line. There is a limit to the possibilities in *personnel*, equipment, and transport, and to the demands of the medical service on other branches of the Army—demands which at times conflict with the other duties of these various branches, and this being the case it appears wiser, for the present at least, to concentrate our efforts on the prevention of infection by the more usual methods, and especially on the detection of early cases. So far as we are successful in this, so far will the importance of this particular problem diminish automatically. One direction in which additional effort would probably be of great advantage is in the medical inspection and care of civilian and native followers.

## NOTES ON THE CONVEYANCE OF SICK AND WOUNDED BY RAIL, WITH SPECIAL REFERENCE TO IMPROVISED METHODS.

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IN order to make the fullest use of a railway when evacuating sick and wounded we must begin at railhead by classifying the patients according to their ability to bear the fatigue and discomforts of a railway journey. When time permits this classification should be made by the Officer Commanding the clearing or stationary hospital at railhead, and he should furnish a daily return, showing the number of patients of each group awaiting transport, to the Deputy-Director of Medical Services to enable him to arrange the necessary train service with the railway Staff Officer. In assigning patients to different groups, the guide or test is, What is the extent to which the man is dependent on others? or to put it in another way, How much can he do for himself? The classification would then be on somewhat the following lines.—

(1) *Helpless patients*.—This group would include such cases as recent amputations of the lower extremity, abdominal wounds, typhoid fever, etc.; in fact all men who could not or must not be permitted to attempt to do anything for themselves, and who require skilled nursing.

(2) *Partially helpless*.—This group includes such cases as compound fractures of the larger bones of the extremities, extensive wounds, convalescents from serious illnesses, etc.—that is to say, patients who while being conveyed by rail would require a certain amount of attendance, but not necessarily skilled nursing, and who are able to do a little for themselves—*e.g.* feed themselves or use a bed urinal.

(3) *Slightly wounded or mild cases of sickness*.

The next point is to classify the various kinds of ambulance trains, which may be done as follows:—

(a) *Ambulance trains* specially built or structurally altered and permanently fitted up with beds, kitchen, dressing room, etc., and supplied with trained nursing and medical *personnel* as detailed in war establishments—in fact, hospitals on wheels.

(b) *Temporary Ambulance Trains*.—These consist of covered

goods wagons taken from the ordinary stock and temporarily appropriated for the conveyance of sick. One wagon could carry packed-up sufficient apparatus, medical and surgical supplies, blankets, etc., to permit of the conversion of a number of wagons when empty into a very fair ambulance train for the conveyance of the sick and wounded on the return journey to the base.

(c) *Improvised Ambulance Trains*.—These are composed of ordinary goods wagons or even open trucks, which on emergency have been collected together, and for the equipment of which only local resources are available.

(d) *Ordinary trains* composed of passenger coaches.

When possible, patients grouped under the first heading would be conveyed in ambulance trains. Patients of the second class (partially helpless) may be assigned to temporary ambulance trains, supplemented, when necessary, by improvised ambulance trains, while light cases composing the third group can be despatched by ordinary passenger coaches.

In actual practice, when a large number of wounded have to be transported, it would probably be found more convenient to form composite trains, of say, eight passenger coaches of six compartments, each taking six sitting-up patients per compartment (= 288 sitting-up) and eight covered goods wagons prepared for the carriage of lying-down patients, taking a minimum of eight patients per wagon (= 64 lying down). This plan, which has been adopted in Austria, after careful consideration of the question, presents the advantages of economising escort, *personnel*, and rolling stock, and provides the required transport in the proportions required by the different classes of wounded.

As regards ambulance trains these have been carefully thought out and all details arranged for; it is not proposed to discuss them further. For the temporary ambulance trains some form of apparatus such as the Linxweiler or Brechot-Despréz-Ameline is the most suitable provided it will fit the rolling stock.

This kind of apparatus consists of a framework which can be taken to pieces for conveyance or storage when not required. When set up it forms a complete framework taking two or three tiers of stretchers arranged like bunks in a ship's cabin.

If it is decided to employ this kind of fitting, it must be purchased and stored ready in peace time, as it would be impossible to improvise it in a hurry. Its great advantage is that it allows of the rapid adaptation of goods wagons, without structural alteration, for ambulance purposes, and the maximum number of patients per

coach can be accommodated provided the apparatus will fit the rolling stock. It is, however, somewhat expensive to purchase, and in all probability is not likely to be available when suddenly required.

One must, therefore, be prepared to make use of one of the plans described under improvised ambulance trains.

*Without Stretchers. Improvised Ambulance Trains.*—The choice of method of adaptation must depend largely on whether stretchers are available or not. In an emergency, when large numbers of wounded have to be transported as quickly as possible, the probability is that a sufficient number of stretchers would not be procurable; we should, therefore, briefly consider the possible means of adapting goods wagons or even trucks for the conveyance of lying-down wounded. All we can do in this case is to lay the patients on the floor of the truck or covered van and endeavour by some means to minimise the shock caused by the vibration and jarring of the wagon. The simplest plan is to spread straw, hay, or brushwood thickly over the floor. The great objection to this plan is that with the jarring of the train the patient soon works his way through the straw and lies on the bare boards. This to a certain extent may be prevented by tying the straw or brushwood into bundles, which has the further advantage of somewhat reducing the risk of fire which is greater when loose straw is made use of. If sacks are obtainable, these should be stuffed with straw, brushwood, peat, or any other dry, resilient material. The ordinary sack measures  $3\frac{1}{2}$  feet by 2 feet, and requires about 12 lb. of straw to fill it. Two men require three sacks to form a mattress. The sacks should be placed transversely to the patients and their adjacent corners tied together to prevent them from separating. It must be remembered that in an emergency the medical personnel would be fully employed in attending to the sick, and could not, therefore, be spared to attempt any more elaborate preparations than those described above. By employing sacks as described, eight lying-down patients could be accommodated with a fair degree of comfort in each covered van.

*With Stretchers.*—When stretchers are forthcoming in sufficient number, one of the methods shown below may be employed. These consist in suspending stretchers or supporting them on brackets, and it would be an advantage if such apparatus were prepared and stored ready in peace. Being, however, simple in nature, the technical units with the troops should be able to manufacture them locally, provided a couple of days' notice were given. The special advantage of these plans is that twice as many

patients can be carried in each covered wagon as can be accommodated on the floor alone.

The vehicles here described are covered goods wagons; they are not the best type of vehicle, but are taken as being those most certainly obtainable. (Postal vans and the longer type of van used in corridor trains are better.) On English lines their internal dimensions are from 15 to 17 feet in length, from 6 feet 6 inches to 7 feet 8 inches in breadth, and 5 feet 8 inches in height, at the sides. The stretcher is 23 inches wide, and 7 feet 9 inches long.

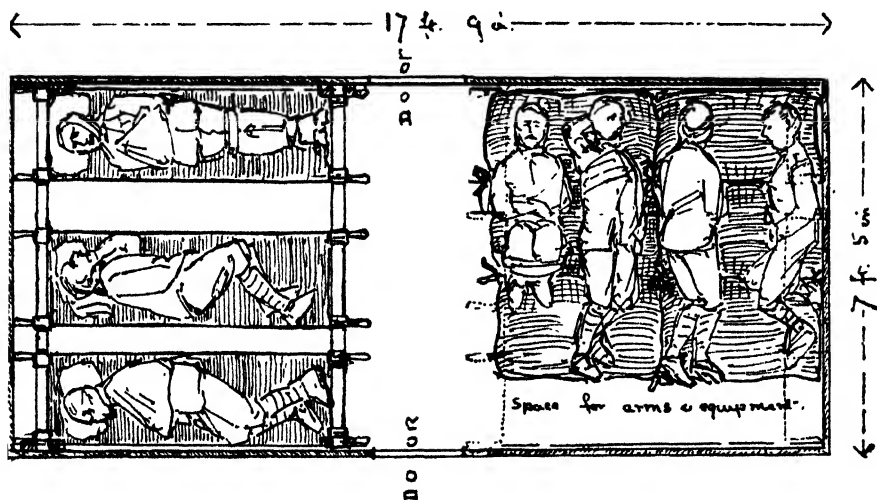


DIAGRAM 1. Large type of covered goods wagon, showing on the left a tier of wounded men on stretchers suspended by the "Port" method, and on the right a lower tier lying on sacks of straw upon the floor of the wagon. The contiguous corners of the six sacks are tied together. Plan. Scale,  $\frac{1}{4}$  inch to 1 foot.

It is therefore apparent that, it will be possible to put six stretchers into the horizontal space in either vehicle, though not commodiously, as in the smaller type of vehicle no room would be left for an attendant.

In this case there must be a combination of methods to make the most of the available space, and in the larger vehicle even, it is better not to put more than four stretchers in one horizontal plane unless the stress is great.

The accompanying diagrams illustrate the extemporisation that may be used to adapt such goods wagons to the carriage of sick and wounded men.

It will be seen that in most of them two tiers only of wounded can be accommodated. With the exception of the Italian method the fittings can be made at short notice by skilled labour, and the materials are such as are easily procurable.

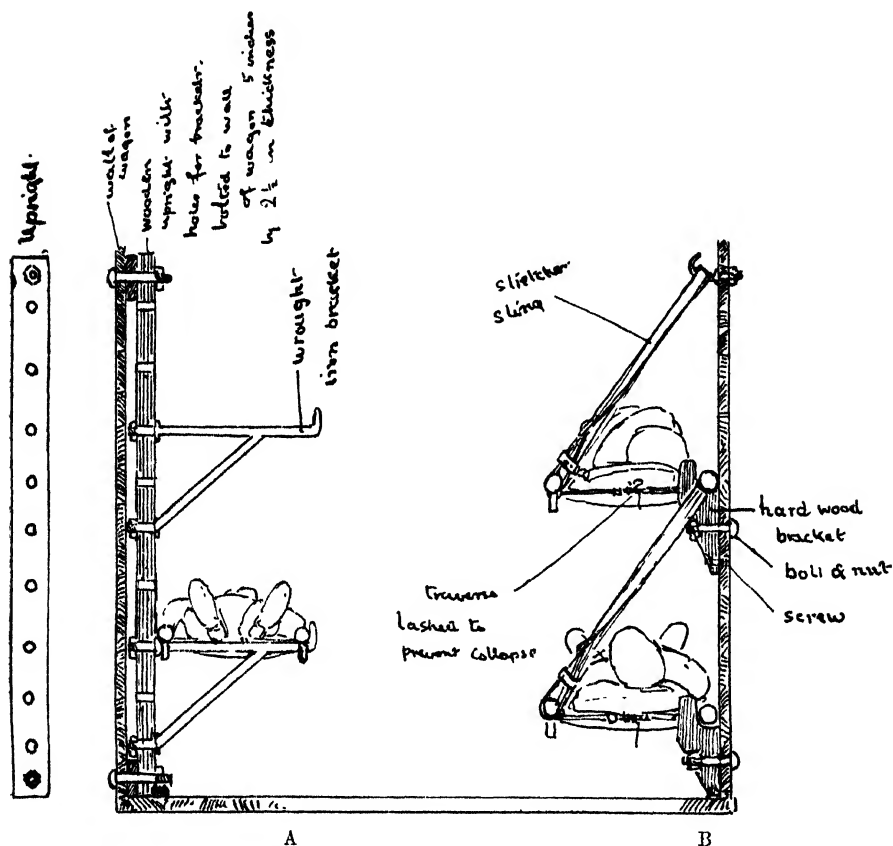


DIAGRAM 2.—A, Italian system (not exact); B, Austrian system (not exact). Elevation. Scale,  $\frac{1}{2}$  inch to 1 foot.

The Italian method requires wrought iron brackets which take time to prepare. The apparatus consists in principle of two uprights, of dimensions 5 feet 8 inches by 5 inches by 2 1/2 inches, which are bolted with 6 inch bolts, one above and one below, to the side of the wagon, leaving a gap of 2 inches in the greater part of the height by the interposition of blocks of this thickness to permit of shifting of the bracket. The uprights, which at the lower end are sometimes socketed into the floor, are perforated at intervals

determined by the space between the two legs of the bracket to receive these legs, which are then secured by a nut at the outer surface of the upright.

Three tiers can be obtained by this method. Each stretcher is supported by two brackets, and the distance between the uprights is 5 feet 7 inches. Four sets of apparatus can be put into a van.

The remaining methods depend on suspension principally.

The Austrian method, see Diagram 2 B, is one partly of support on brackets and partly of suspension. With our pattern of stretcher it is not a desirable method as the traverse has consider-

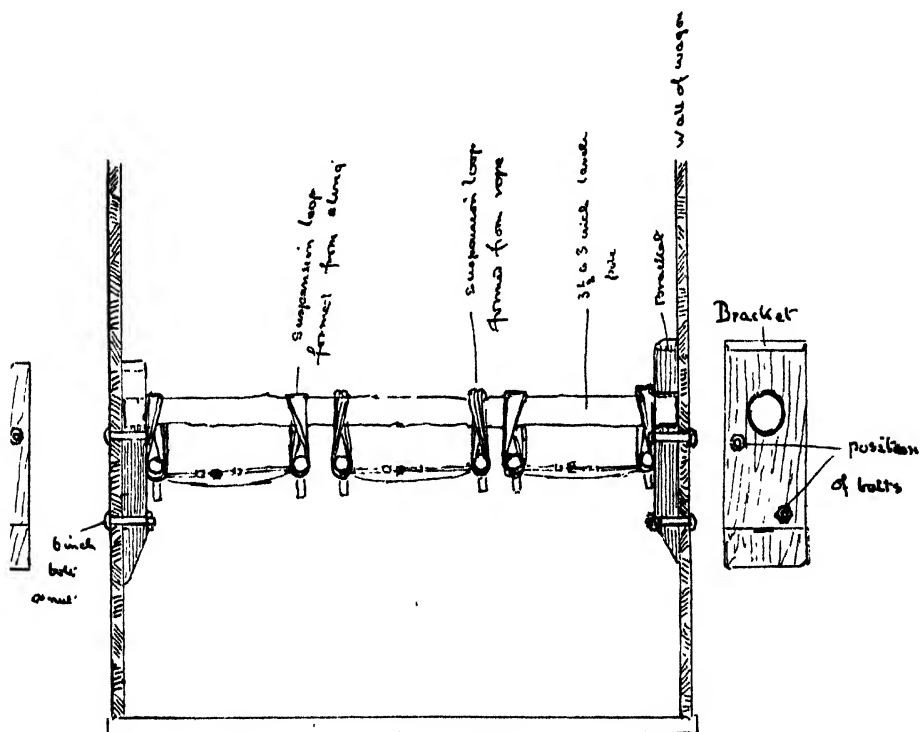


DIAGRAM 3.—Covered goods wagon fitted to carry wounded men on stretchers. Port system. Elevation. Scale,  $\frac{1}{2}$  inch to 1 foot.

able stress thrown upon it, and being jointed may collapse unless it is securely lashed (which should be done in all cases for railway travelling), and the slings require laborious adjustment and may probably elongate during the journey.

The soundest system, mechanically, is that in which a cross

beam is fixed to the sides of the wagon, and the stretchers are suspended from it. Suspension from the roof is not the most secure method.

In Diagram No. 3 the transverse beam is shown too low. There should be 3 ft. at least between the under surface of the stretcher and the floor, to make room for wounded men lying on sacks on the floor, two tiers being thus obtained.

The fittings required per van are : eight brackets of wood, preferably elm, 1 foot 6 inches by 9 inches by 3 inches, four of them perforated with a hole  $3\frac{1}{2}$  inches in diameter to receive one end, and four slotted to receive the other end of the pole ; sixteen 6-inch bolts with nuts to hold the brackets to the wall ; four larch or fir poles of 3 to  $3\frac{1}{2}$  inches diameter and such length as exactly to fit the diameter of the wagon, leaving sufficient play to get them into position. Six stretchers with slings. Thirty yards of  $\frac{3}{4}$  inch circumference cord to make suspensory loops for the stretchers. The suspensory loops must be made only long enough to allow the handles of the stretcher to be introduced into them when they are in position round the pole. One tier only is thus suspended.

The floor space beneath the suspended stretchers is prepared as mentioned by the laying down of sacks of straw or other material to break shock (see Diagram 1). Six sacks of 3 feet 6 inches by 2 feet, each filled with 12 lb. of straw, and with their contiguous corners tied together, may be placed in each half of the floor, their long axes parallel to that of the wagon, leaving an alley-way from door to door. Upon each group of six sacks four wounded men may lie. There is space between their feet and the opposite wall in which to lay arms and equipment. For this, 12 sacks, 144 lb. of straw, and 5 yards of rope yarn will suffice.

The method of Zavodouski is the classical suspension method, but its disadvantages are :—

- (a) The difficulty of getting a reliable support for the cable.
- (b) The difficulty of finding good cable.
- (c) The liability to excessive movement when fixed.

A combination of that method with the method of suspension from a transverse beam would seem to be mechanically sounder, and to meet the case. It is illustrated on diagram No. 4.

Two tiers of stretchers, in all eight stretchers, can be suspended, leaving an alley-way between them under ordinary circumstances. Under stress four additional wounded, twelve in all, can be accommodated in the central spaces ; no space is then left between the stretchers.

(a) The simplest fittings are necessary. (b) Lateral movement can easily be checked. (c) The weight is more securely supported than in the case of the Zavodouski method.

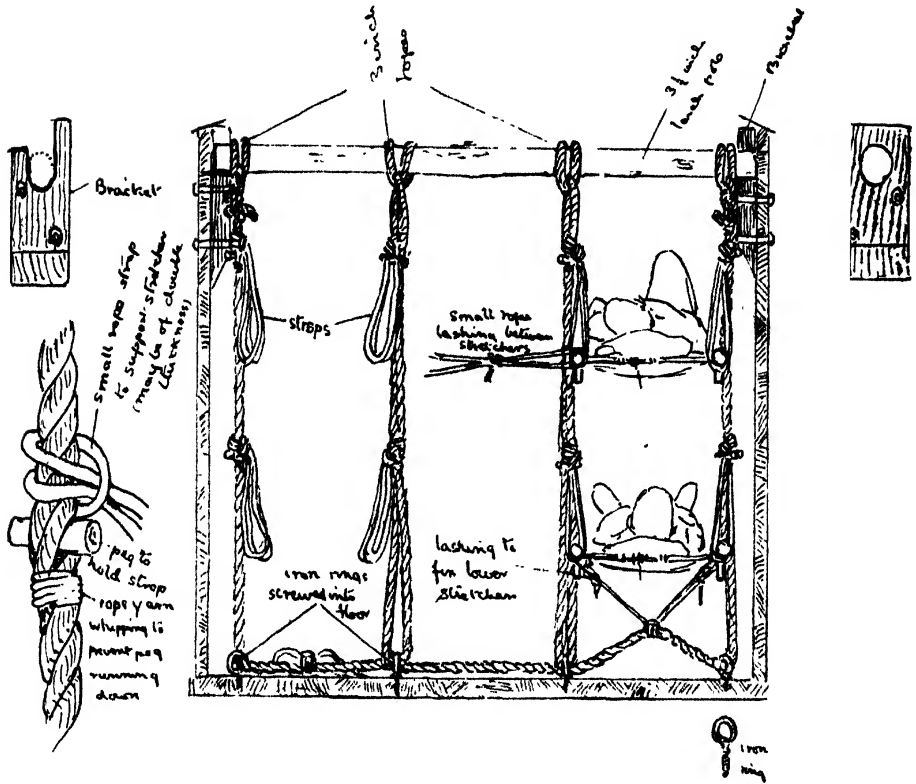


DIAGRAM 4. - Covered goods wagon fitted to carry eight men on stretchers. Scale,  $\frac{1}{2}$  inch to 1 foot.

The following articles are required: Sixteen 2-inch diameter iron screw rings  $\frac{3}{8}$  inch thick; eight wooden brackets (elm preferred), four perforated and four slotted with  $3\frac{1}{2}$ -inch holes; sixteen 6-inch bolts and nuts; four larch or fir poles not less than  $3\frac{1}{2}$  inches diameter of lengths to fit the wagon; sixty yards of 3-inch hemp rope in four 15-yard lengths; eighty yards of small rope ( $\frac{3}{8}$  inch); twenty-five yards tarred rope yarn; thirty-two round ash or oak pegs  $3\frac{1}{2}$  inches by 1 inch. One-third more small rope and pegs will be necessary if twelve stretchers are to be used instead of eight per van.

In all cases the longitudinal distance between the supports, whether brackets or beams and ropes, should be 6 feet, the length of the canvas of the stretcher. The method of preparing this apparatus is as follows: The iron rings are secured into the floor at the intervals shown in the diagram, the end rows 12 inches from the end of the van and the centre ones 6 feet from them. The brackets are next bolted in position, the upper edge of the hole and slot for the ends of the pole being  $3\frac{1}{2}$  inches below the junction of the roof with the wall. The poles are next put into place. The 2-inch ropes are now rove.

Commence with a clove hitch and two turns round the rope round one end of the pole, touching the bracket. Take the slack end and reeve it through the ring below the bracket, passing it from the wall side inwards. Reeve it through the next ring from without inwards. Bring it up vertically and fasten it round the bar with a clove hitch 24 inches from the first knot. Bring down the slack end, pass it from without inward through the ring vertically below it, and from within outwards through the next ring, bring up to the beam and fasten with a clove hitch as before. Reeve through the two last rings and fasten off with a clove hitch and two turns round the rope. Now with a marline spike open the strands and pass the pegs where shown in diagram, place whippings below them, fasten the straps suspension loops formed of small rope with slip-knots above them. The apparatus is now ready for the stretchers. The straps should be 1 foot in length.

Lashings as indicated in the diagram should pass from the centre of the 3-inch rope where it crosses the floor to the handles of the lower stretcher; these stop vibration of the stretchers, and help to keep the rope taut; and also between the handles of the upper stretchers of parallel tiers to control lateral movement.

[Note.—In much of the apparatus devised for the carriage of wounded by rail, springs, spiral and elliptical, have been used; but it is found experimentally that the greatest comfort is derived from a contrivance that absorbs or deadens shock, and that the vibration caused by lively springs only adds to the patient's discomfort; therefore, rope-suspension and straw cushions are better than elastic springs for either suspension or support.]

The adaptation of open trucks to the carriage of wounded, upon sacks or stretchers upon the floor, involves the construction of a framework on the principle shown in Diagrams 3 and 4, substituting strong uprights for the brackets to support the transverse poles, mortising the transverse poles into them, fastening them with nails, and bolting the uprights to the sides of the truck.

*Personnel.*—In this article we are only concerned with temporary and improvised ambulance trains, as the permanent ambulance train has a definite scale laid down, while the lightly-wounded patients travelling in passenger coaches could do without any assistance between rest stations. The use of corridor trains would be of the greatest advantage in economising *personnel*; but such rolling stock, although increasing frequency is not common, and for the purposes of this article the commonest type of vehicle must be considered. In the temporary ambulance train there should be one attendant to each van containing lying-down patients; one attendant should be provided in the improvised ambulance train for the severe cases, but as this will, perhaps, not be possible, one trained man may be assigned to every three or four vans, each of which should carry, say, four severe cases, and four to six slightly-wounded men able to give a certain amount of attention to the severe cases.

*Equipment.*—The essentials are a bed pan and urinal for helpless patients, some medical comforts, a few dressings, blankets, and a small supply of water besides what is in the patients' water bottles.

*Ventilation and Warming.*—In all temporary or improvised trains this question is most difficult. The covered goods van is naturally very hot and stuffy in summer and extremely cold in winter. By slightly opening the doors and fixing them, in summer ventilation can be fairly well provided; but as in winter it is impossible to provide means of heating the car, the patients must be well covered. When travelling by night some kind of artificial light is a necessity, as a helpless man shut up in the dark suffers considerably.

## PRELIMINARY REPORT ON THE INVESTIGATION INTO THE BREEDING PLACES OF THE SAND-FLY IN MALTA.

BY CAPTAIN P. J. MARETT,  
*Royal Army Medical Corps.*

THIS investigation is the sequel to the work on sand-fly fever carried out by Lieutenant-Colonel C. Birt in 1909, and its aim is to find some means whereby sand-flies can be reduced in numbers. Not only do they give rise to sand-fly fever, but they are also suspected to be the cause of pellagra and of Aleppo button, and will probably also be found to be the cause of various anomalous skin lesions in countries the home of the sand-fly.

The *Phlebotomus papatasi*, commonly known as the sand-fly, belongs to the Psychodida. It was first described by Rondani in 1840, since whose time it has been the subject of many investigations. Grassi's monograph on the papatasi is the most recent work on the subject; in it he describes the various stages of the insect in its development from egg to imago. In part III. of this work, under heading "Practical Conclusions," he states that "they breed in drains and in dark cellars where the larvæ and pupæ can be found all accumulated together with refuse, stones, bricks, and more especially pieces of cretonne." Austin believes that they breed in cesspits and in latrines. Kirby, in an 1885 edition, gives as their breeding-places fungi and decaying vegetable matter; whilst Ross and Levick, in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, September, 1905, have stated that they breed in house-tanks. As a result of the above statements all these places have had to be examined, as well as many others.

Their eggs, larvæ, and pupæ have been carefully searched for in every conceivable substance; the objects were first examined with lenses, then put up in cages or under chiffon. Portions were in certain cases broken up, washed in water, and the living matter found floating was strained off and examined under the microscope. To give a list of objects thus examined would be a lengthy proceeding and would be futile, because I was unable in all instances to imitate the natural surroundings whence they were derived.

In order to carry out observations under natural conditions, various places were trapped. A list of these may be of use as giving both positive and negative results, and is as follows:—

- (1) Garden pond, together with a portion of rockery covered

with creepers; from it, however, no *P. papatasii* were obtained. A few dragon-flies and mosquitoes, and midges in quantities bred out, in spite of the fact that the water was well stocked with gold fish.

(2) Garden wall. This was opened up where there was an opening permitting of a loose stone being removed, and a hole leading into the interior of the wall, about a square foot in diameter, was covered in with book muslin. This trap was completed by the end of April. Since June 2nd it has contained sand-flies, which appear about sunset and increase in numbers during the evening, and about 10 to 11 p.m. are very numerous; while at 5 a.m., when the sun is shining, not a trace of them remains.

(3) Roots of trees with earth undisturbed. These areas include portions of the base of a tree and the surrounding earth, which are enclosed by used X-ray plates and covered in with gauze and chiffon. Up to date these have not given any results. The trees thus trapped were the fig, orange, sumach, locust bean, prickly pear, and oleander. Vines and olive trees could not be trapped.

In Malta, owing to the shallowness of the soil, it is customary to cut out pits in the rocks before planting trees; these holes are then filled in with the broken stones and with earth. It is quite conceivable that sand-flies under certain conditions could breed in these places, which would account for the fact that oleanders, which are largely grown, are accused by some people of being their breeding haunts. Unfortunately, oleanders so planted are too exposed to be trapped in the manner described.

(4) Portions of decayed and living bark on trees. These were covered in, but no sand-flies have been found in these traps.

*Note.*—Trees frequently are left untrimmed, with the result that they are very often covered with decayed branches. The sumach decays at the tips of the branches, and where this occurred a larva has been found which, up to the present, has not bred out.

(5) Portion of an embankment which is made up of loose stones and earth. From this sand-flies have been caught in numbers. On May 18th the first sand-flies were obtained in a sheltered portion of this embankment. Here they could be caught for a matter of fourteen days before they appeared in the garden wall, which is a more open place and exposed to the wind.

(6) Wells, latrine tanks, ventilation shafts, and manholes have all been trapped and are under observation; in these the *P. phalaenoides* breeds out.

(7) A portion of an underground cave in Gozo which is known

to be infested in summer. A natural cleft in the rock was trapped, and I have been informed that sand-flies have bred out.

Amongst other places ordinary garden soil from various depths has been trapped, but in no instance have sand-flies bred out in these experiments, which were carried out in boxes.

The examination of walls for eggs, larvæ, and pupæ:—

*Eggs.*—The eggs of the sand-fly have not as yet been found in walls. They can, however, be obtained in two ways: (1) by allowing the female to deposit them *in vitro*; and (2) by killing an impregnated female and gently pressing the abdomen.

The eggs are minute and opalescent, white when fresh, and, according to the Imperial Entomologist to the Government of India, they are from 0.1 to 0.15 mm. long. They are rounded at both ends, cylindrical, and slightly curved. On keeping on a slide they soon turn brownish in colour and their contents become smaller and wrinkled.

*Larvæ.*—In the wall, after much searching, two larvæ have been discovered. In addition to the trap in the wall, two openings were made, one at the height of 5 feet, and the other at ground level; from both these openings sand-flies can be captured in large numbers.

The walls are made as follows, this description applying more especially to the wall that has been kept under observation: Height about 10 feet, width at base about  $4\frac{1}{2}$  feet, width at top about 18 inches. *Construction*: The stones used in the building of this wall are sandstone and limestone conglomerate; the large stones are used for the outside supports, and the smaller stones are thrown in loosely between the supports, together with any refuse and earth. Usually the walls are built from stones which have been removed from the solid rock in the garden, where a rain-water tank has been cut out for purposes of storage. These stones, instead of being carted away, are used to build the walls, as without them the winds would be a great drawback to agriculture. The surface of the walls is then partially closed by smearing the stones with pozzolani, after which they are either colour-washed or left untouched. The temperature inside the walls varies, the highest yet recorded being 76° F., with an outside temperature in the sun of 120° F. The stones and earth above ground level are dry, but at ground level and below they are damp, and the detritus, instead of flying about, as it does when thoroughly dry, falls without raising a cloud. On placing the hand in a hole a cool breeze can be felt, which probably assists in keeping the lower portion damp, by the

deposition of the excessive water vapour in the hot air on its cooling down. In the lower opening in this wall two larvæ were found; both were discovered on small stones which were cool and damp and hidden away under a big stone; both were found on the under surface of their respective stones.

The following is a rough description of a larva after carefully watching it with a lens and with the naked eye. Length about  $\frac{1}{2}$  inch, colour slightly darker than the detritus, the head being much darker than the body, but not so dark as the tail hairs. The body covered with hairs or spines, as described in the Second Report of the Imperial Entomologist to the Government of India. This specimen was in the stage where the flies have two long and two short hairs, which are spread out fan shape behind it and are kept raised, the tail itself not being raised. The larva moves in exactly the same way as a caterpillar—that is, with a succession of forward movements which are caused by its prolegs, the number of which was not ascertained. It progresses slowly, and continually pecks at the stone on which it is placed. In feeding, which is persistent, the head appears to strike in a similar manner to a snake, and it seems to tear at the substance on the surface of the stone. Down the centre of the body, in a zigzag, is easily seen the alimentary canal standing out black and apparently full of detritus; in its progress it wormed its way under the detritus, invariably allowing its terminal hairs to protrude from under the mass.

*Pupæ.*—Only three pupæ have as yet been found. One pupa case was obtained from the under surface of a stone lying across a slight depression which was practically free from detritus. The stone on which this pupa was found was placed about a foot above where the larvæ were obtained. The pupa case shows a rent at the head extremity, through which the fly escaped; at its caudal extremity is placed the shed larval skin, all crumpled up, but with three terminal hairs projecting, which are as long as the pupa and crumpled larva case put together.

The three pupæ found were on the under surface of stones. Two have hatched out, a dark one into a male sand-fly and a light-coloured pupa into a female; the remaining pupa is light-coloured and has not as yet hatched out.

*Examination of an Embankment.*—The embankment examined is only a small portion of the Cottonera Lines, which extend for some 7 or 8 miles, and in places have a sloping surface of 20 to 30 yards. It is built up against the outer walls of the lines, which rise 40 to 50 feet, thus covering a large superficial area. Loose

material, consisting of large and small stones, has been piled up against the inside of the walls to afford greater protection to the old defences, which are known as the Cottonera Lines. In places this accumulation of stones has been covered over with a layer of earth. The result is that the embankment surface is uneven, and everywhere small openings lead right into the depths. On digging into the embankment the upper two feet or so of material is perfectly dry and lies as a crust over the surface; under this the stones are damp, and, as has already been mentioned, a free current of air can be felt blowing gently through the embankment. Here four larvæ have been found under exactly similar conditions as in the wall.

No detailed examination of these larvæ has been made; two were lost, owing to the fact that they wriggled off the stone, owing presumably to the sunlight. The way in which this occurred was as follows: The larva appeared to suddenly arch itself on its head and tail and flicked itself off the stone on to the ground. The remaining larvæ, which were easily recognised by the absence of prothoracic legs and by the presence of the terminal hairs, were put up in chiffon-covered cages, which were covered over with wet towels; these assisted in keeping the air moist and also helped to darken the cages.

It is a very noticeable fact that although sand-flies are seen escaping from their breeding haunts in large numbers, yet their pupæ and larvæ are only found in small quantities. This certainly is due to the great difficulty experienced in searching for them, and to the fact that, placed in hollows in stones, where they are unseen, and on the under surface of stone, the larvæ might easily fall off and the pupæ be rubbed off. Grassi, in his research, has mentioned this. He states that he has been able to find more pupæ than larvæ; we, on the other hand, have found more larvæ.

It is just possible that the preliminary stages might be passed on a host, and the specimens which are found may be such as have fallen off and have adapted themselves to their surroundings.

Experiments are being carried out with captive sand-flies, and it is hoped to be able to work out their life-history and their habits.

The question of reducing the number of their breeding-places will only be touched on here. The breeding-grounds are extensive, and money would have to be expended to reduce them. Lieutenant-Colonel Birt states in his article "*Phlebotomus Fever in Malta and Crete*," p. 239, second paragraph, second section: "C Block, Floriana, Verdala, and the Royal Army Medical Corps Quarters,

Cottonera, gave the largest admissions. Imtarfa, 630 feet above sea level, and St. Elmo Fort, strength 300, were almost exempt." The three places first mentioned are hemmed in by bastions—the breeding-places—where there is little air in summer. Imtarfa has no old fortifications round it and is well exposed to the wind. At St. Elmo there is not very much wind, but the facings of the fortifications are kept in good repair for military reasons.

Sand-flies exist at both Imtarfa and St. Elmo, but there is nothing like the same inconvenience from them in these places. Possibly, as with yellow fever, the lessening of flies per area does away with sickness.

The distance of flight of the sand-fly is intimately mixed up with any preventive measures, and this subject is receiving attention.

In conclusion, I have to express my thanks to Captain Biggs, Royal Engineers, for assistance in digging out the embankment and for a plan of the lines; and to Corporal T. Kerr, R.A.M.C., my assistant, who has worked most wholeheartedly.

# A TOUR OF INVESTIGATION AS TO THE PREVALENCE OF KALA-AZAR IN KASSALA AND BLUE NILE DISTRICTS, SUDAN, FROM JANUARY 12TH TO MAY 16TH, 1909.<sup>1</sup>

BY CAPTAIN L. BOUSFIELD.  
*Royal Army Medical Corps.*

*(Continued from p. 183.)*

THE disease has appeared amongst the troops, but as far as the Egyptians are concerned only two cases were found on this tour, one a shawish of the works department at Gedarif, the other an Onbashi in the Medical Corps, from Singa, in the Khartoum Military Hospital.

The shawish apparently contracted the disease either at Kassala or along the Atbara on the way to Gedarif. He was first taken ill at El Fasher.

One suspicious case was seen at Kassala in the 4th Battalion, but the parasite could not be demonstrated.

The Arab Battalion gives more cases, three being definitely diagnosed, one in the 1st Company, one in the 3rd Company, and the third being a morasla of office. My belief is that the 3rd Company is seriously infected, and it is founded on the following points:—

No. 612, a shawish, an Abyssinian, belonging to the 3rd Company, was diagnosed as kala-azar on October 23rd, 1908, the films being sent to the Gordon College, and the report being "evidence of Leishman-Donovan bodies, very few in number, some free, others phagocyted." He was first taken ill at Gallabat on July 7th, 1907, and was ill one month with fever, and then sent by sick convoy to Gedarif Hospital. He then had fairly good health till September 21st, 1908, when he was admitted to Kassala Hospital and kala-azar was found. He greatly improved under quinine 30 grains daily, and the spleen decreased in size. Further spleen films did not reveal parasites, and he had no fever, and so was returned to duty. His tukl, &c. were burnt on admission to hospital. Later he moved to Gedarif, being kept under medical supervision.

I saw him at Gedarif on February 14th, 1909, and found him thin, but in fair health and feeling well. The spleen was enlarged

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<sup>1</sup> Final Report.

1½ inches below the costal margin, and the liver was normal to percussion. There was slight anæmia, but no jaundice. The temperature was 99·2° F. in the morning when first seen, but subsequently when taken night and morning was normal, or 99° F. Splenic puncture revealed no parasites. He lived with his wife in a tukl and she showed no signs of disease, and no bugs were found. I saw him again on March 22rd, 1909, and his condition was the same. This apparently is a case that has either recovered, or one that is enjoying a long period of improvement.

But my opinion is that such a case, and any really suspicious case, should not be allowed to remain in the Army on account of our very limited knowledge of the method of conveyance of the disease and of the capability of a chronic case infecting others. The disease amongst the troops is at present very limited and, therefore, I believe this risk is unwarrantable.

On examining the 3rd Company I found two cases suspiciously like kala-azar (No. 1080 and No. 270), but was unable to prove the diagnosis by finding the parasite.

On referring to the deaths that had occurred in the Arab Battalion the following cases raised suspicions that they may have been caused by kala-azar, and it is striking that they are all in the 3rd Company :—

Nafar, No. 103 died	..	Gedarif, Feb. 23, 1908	..	Diarrhœa.
" " 931 "	..	" May 21, "	..	Kala-azar (?)
" " 116 "	..	Kassala, Nov. 21, "	..	Diarrhœa.
" " 1,182 "	..	" Dec. 5, "	..	Anæmia and cancrum oris.

It does not seem unreasonable to have serious suspicions that these may have been cases of kala-azar, since two were diagnosed as "diarrhœa," not dysentery or typhoid fever, the latter being rare in the Sudan, while diarrhœa as the terminal event in kala-azar is extremely common—one might say the usual thing—in the Sudan.

"Anæmia and cancrum oris," the former a well-known symptom of advanced kala-azar, the latter a common final complication and one but rarely seen in the Sudan except amongst young debilitated children.

No 931 evidently was so like kala-azar that he was diagnosed as such.

On referring to the shawish we found that the disease probably started at Gallabat in 1907; this town we knew to be infected, and as these cases all occurred in 1908, I think it is dangerous to keep such a man in the Service.

Mafaza, prior to this investigation, was thought to be the hot-

bed of the disease, and on piecing together all the available information it is found that thirteen cases from this station have died, eight definitely proved as kala-azar, and the remaining five almost certainly of the disease.

These cases are now enumerated :—

Case	Date of death	Disease	Place of death
(1) No. 1,128 Medical Corps .. ..	Aug. 27, 1907 ..	Kala-azar ..	Cairo
(2) Police A. A. .. ..	Oct. 14, „ ..	„ ..	Wad Medani
(3) „ A. W. .. ..	„ 18, „ ..	„ ..	„
(4) W. Onb., Medical Corps.. ..	Feb. 14, 1908 ..	„ ..	Kassala
(5) Police No. 138 .. ..	Mar. 21, „ ..	„ ..	„
(6) H. W., Abyssinian .. ..	April 8, „ ..	„ ..	Mafaza
(7) Police No. 148 .. ..	Jan. 14, 1909 ..	„ ..	Gedarif
(8) S. W. I., Sudanese .. ..	April 8, „ ..	„ ..	Mafaza

The remaining five cases I think are almost certainly kala-azar :—

Case	Date of death	Disease	Place of death
(1) Arab .. ..	Nov. 8, 1907 ..	? Kala-azar ..	Kassala
(2) Morasla of Mamour .. ..	Dec. 12, „ ..	Dysentery ..	Gedarif
(3) Female servant of Mamour ..	Dec. 27, „ ..	General cedema ..	„
(4) Mamour .. ..	Feb., 1908 ..	? Kala-azar ..	„
(5) Police No. 165 .. ..	„ 6, 1909 ..	{ Influenza and cancrum oris }	„

In this list, Nos. 2, 3, and 4 came from the same compound, were taken ill about the same time, and all died within three months of one another.

Nearly all the above mentioned cases in both lists were taken ill while at Mafaza.

On referring to the police I find that out of forty-seven men who were stationed at Mafaza in 1907 and 1908 eight have died, the causes of death being as follows :—

Kala-azar .. ..	4
Influenza and cancrum oris .. ..	1
Cancrum oris .. ..	1
Killed by buffalo .. ..	1
Cause unknown .. ..	1

Thus it appears probable that six died of kala-azar—i.e., rather under 13 per cent.

It is to be regretted that during my visit in Kassala Province there was a general move of all the police, so that many were not seen. However, I inspected four at Gedarif, who were on their way from Mafaza to Gedarif, and one was not well and had an enlarged spleen, but another, No. 109, was considered to be possibly kala-azar and the Senior Medical Officer, Kassala, was notified to keep him under medical observation.

On arriving at Mafaza it was found that this policeman (No. 109) had occupied the same tukl as policeman No. 165 (see above), and both apparently cohabited with the same prostitute.

All the police present at Mafaza appeared healthy except No. 140, who had a very large spleen, but was not wasted to any degree; spleen puncture showed no kala-azar parasites.

Two prostitutes who had lived with police, who died from kala-azar, were examined and found to be apparently perfectly healthy.

It was a matter of surprise to find at Mafaza very few cases even resembling kala-azar. Indeed, only one case was definitely diagnosed during my stay, and only four others were found to be likely, and of those only two were clinically certain. A house to house inspection was made of all the six villages comprising Mafaza, and thus it appears that the disease came in a more or less epidemic form, and was practically restricted to the Government employees.

It was found quite impossible to trace the origin of the disease, but my belief is that it came from either—

(1) An Abyssinian I found with kala-azar in May, 1908, and who, although he stated he had only been ill six months, appeared to me to have been ill considerably longer, or

(2) The two police, who came from Singa in May, 1907, for two months to Mafaza on cattle-plague duty. These two died at Wad Medani in October, 1907, and may have imported the disease to Mafaza from Singa, which we know now to be considerably infected.

The frequent changes of officials and police render it almost impossible to get reliable information on this outbreak, and there is no doctor to refer to, but it is satisfactory to be able to report fairly confidently that this town is not a centre for the disease, and at present contains very few persons likely to be suffering from it.

The somewhat drastic measures taken in 1908, of burning the tukls, angareebes, &c., have proved eminently satisfactory and should encourage this procedure in the Sudan, especially as it is not expensive, for the finest tukl seldom costs more than one pound Egyptian.

In cases where death occurred the tukl, angareebes, and contents likely to harbour bugs were burnt, and Government compensation not exceeding £1 (one pound Egyptian) per tukl was given; the value was usually estimated by the mamour and sheikh, and checked by myself, and the amount paid on a chit given by the medical officer to the owner, who presented it to the mamour.

Other cases were isolated in their tukls, and a new tukl was built for the rest of the family at Government expense; angareebbs, &c., from the old tukl were not allowed to be taken to the new, and any infringement of this was to be punished by a refund of the money given for the new tukl.

In the event of death, orders were given for the old tukl and contents to be burnt down without any recompense. In stations where there were several cases, a special compound and tukls were built for their accommodation. However, this caused considerable trouble at Gallabat, for one woman, who was seriously ill, on being informed that she would be removed to this isolation compound, was taken away during the night to a village about 12 miles distant, and had to be brought in by police.

It was found wiser not to insist on isolation until just before departure, as such a procedure frightened away any new patients, and quite destroyed any further chances for medical work, or of obtaining information; this occurred at Gallabat.

Personal supervision of the destruction of articles is absolutely necessary, and all such articles should be marked, otherwise old and useless things are substituted, compensation obtained, and the infected angareebbs, &c., taken to other tukls.

With Government compensation there is no difficulty with regard to destruction of houses and articles, but isolation in separate quarters is a most difficult procedure to carry out.

A glance at the map (p. 165) shows that the disease is extremely widespread, though at present it seems to have gained no great hold upon the people.

The following recommendations are put forward with a view to combating the spread of the disease:—

- (1) Burning of infected tukls, angareebbs, &c.
- (2) Isolation of those attacked by the disease and compulsory isolation quarters for chronic cases. One such settlement would be sufficient for a radius of 80 to 100 miles, provided the Government provide transport for the patients. Some form of Government supervision of such settlements will be required.
- (3) Special quarters should be allotted to the Abyssinians in the larger towns, such as now exist in Gedarif, and compulsory residence in this quarter enforced. No difficulty should be encountered in carrying out this, as they desire to live together.
- (4) Officials should take great care when selecting Abyssinians as servants; when medical advice is wanting, any showing emaciation with enlargement of the abdomen, should be rejected. Enlist-

ment of this race for the Police, Arab Battalion, &c., should be carried out with great caution.

(5) Inspectors, mamours, and all officials who have to visit small villages, should have tents as part of their travelling equipment. The custom now prevalent is that an official, when visiting a village, is shown into a sheikh's compound and supplied with an angareeb to sit on. Since at least 75 per cent. of native angareeb harbour bed-bugs, this is a dangerous procedure, which can easily be obviated by making a policeman or servant carry on his camel or mule, a small camp chair which can at once be placed ready for the official. This I believe to be of the greatest importance; it is easy to carry out.

(6) Native angareeb should never be employed on trek, and only new ones should be purchased, and these should be carefully examined to see if they harbour bugs. It is important to see that police and servants do not borrow angareeb on safaria.

(7) My impression is that rest-houses are safe, except in isolated places, where the travelling natives naturally use them, if nobody else is present. I failed to find bugs in any rest-house in Kassala Province, and have not been attacked by these pests in them.

However, it must be stated that I most carefully examined the Inspector's house at Gallabat, and could find no trace of bugs (the wooden ceilings could not be searched), and I informed the Inspector that I thought his house was free and he agreed with me.

But when the rains started he sent me an indignant and bantering letter, informing me that bugs were falling in masses from the ceilings, and that he had had to clear out all his furniture.

I would strongly recommend the destruction of this house, which is in very bad repair, and which was occupied in 1907 and 1908 by a kala-azar patient.

(8) Further investigation is urgently needed up the Blue Nile, which appears to be the most extensively infested district.

Ample time should be allowed to the medical officer, if any good results are to be obtained.

(9) Medical officers, civil and military, should be taught the symptoms of this disease, as at present most of them know nothing or very little about it. Usually they are not proficient at microscopic work, and those who have the necessary knowledge have no microscope and apparatus.

I would strongly urge the proper teaching of native officers, and the posting only of those proficient at such work in the Kassala and the Blue Nile districts. This instruction could be given at Cairo, when the officers join or return from leave, or it might be carried

out at Khartoum. Without these steps I consider that the medical departments will be quite inefficient in dealing with this disease, which is at present undiagnosed, and so no preventive measures are instituted.

(10) Dogs should not be kept by officials.

(11) At present angareebes are used by the troops and police. I would strongly recommend that only new angareebes be allowed to be bought unless the previous owners are known. That all angareebes be placed uncovered exposed to the sun from early morning to sunset. This could be enforced without great difficulty, and is now being carried out at Gedarif, Gallabat, and Mafaza. Officials should be ordered to make constant inspections at odd times to see that this is carried out, and the offenders punished or fined.

(12) The invaliding from the army and police of all those who are weak and wasted, and have enlarged livers and spleens.

The number thus affected is at present very small, and the possible risk to others considerable (see account Third Company Arab Battalion).

My belief is that with our present very incomplete knowledge of this disease it is extremely dangerous to keep such men in the fighting and administrative forces of the Government. With proper discretion I think this procedure will limit the disease amongst Government employees; and the cases should always be sent to or be seen by the Senior Medical Officer of the District before invaliding, and he could then make suitable arrangements to prevent them spreading the disease amongst the civil population.

All that is required is a firm and dictatorial dealing with such cases, a proceeding justified when one considers the fatal character of the disease and the danger to the general public.

(13) The most effective way of getting rid of bugs from wood-work, crevices in walls, &c., is to play the flame direct from a painter's lamp, and subsequently coat with a thick wash of lime.

Owing to the very short time allotted, it was considered advisable to make a definite diagnosis by splenic puncture. The writer is well aware this procedure is open to criticism, but circumstances must be taken into consideration, and as patients were usually seen but once, even if blood-counts, &c., had been made, the diagnosis would still have been in doubt, and the slight risk to the patient had to be faced rather than leave a case at large to infect the general community. Altogether I have now performed over 120 splenic punctures without any dangerous symptoms or bad results.

My experience of liver puncture, a procedure held to be safer,

is small ; the procedure has not been successful in finding parasites ; latterly it has only been employed in suspicious cases of kala-azar who presented but slight enlargement of the spleen. Possibly when patients are in hospital under constant observation, liver puncture is the more justifiable method ; but if the result be negative, I can see no reason why splenic puncture should not be employed, provided the right method be used. I have met several instances where doctors have used a small exploring needle and syringe for splenic puncture, and to my mind this is but courting disaster, and quite unnecessary.

Recently in Egypt a doctor told me of two fatal cases, one from splenic and the other from liver puncture, but in these two cases such a syringe and needle had been employed. Only three of my cases showed any symptoms after puncture and these were trivial:—

(1) One case vomited and fainted about ten minutes after puncture, but rapidly recovered, and showed no further bad symptoms, and was quite well the next day, and also ten days later when seen by Captain Drew.

(2) A case with a maximum temperature of 100° F. for some days previously had the evening after puncture a rise to 105° F., but no bad symptoms or signs.

(3) One case had pain for twenty-four hours over the seat of puncture, but had no accompanying signs. In no case have I seen any symptoms or signs pointing to blood effusion into the peritoneal cavity, and the only case that in any way worried me was the man who fainted, and this was evidently a case of shock.

Spleno-medullary leucocythemia is practically unknown in the Sudan, and if time allows can always be excluded by peripheral blood examination.

The method employed was as follows : If a stay was prolonged, and the chance of seeing the patient again was good, then a peripheral blood examination was made ; if not, a splenic puncture was undertaken thus:—

(1) The limits of the spleen were carefully determined by palpation and percussion.

(2) The skin cleansed by—

(a) Soap and water. The spot chosen varies with the size of the spleen, but it should not be too close to the edge of the organ.

(b) Spirit or turpentine. •

(c) Lysol solution.

(3) An ordinary all-glass hypodermic syringe with a *hypodermic* needle about 1½ inches long, is thoroughly boiled, the receptacle found most convenient being a small native brass coffee-pot, only used for this purpose.

The site of puncture is again verified before puncture. The patient is told to take a deep breath and hold it ; several preliminary exercises are done, so that he fully understands what is required, and that he is not to let go his breath till the needle is withdrawn. The needle is then inserted rapidly and vertically, and several drops of blood are at once drawn off. The proceeding does not cause pain to any degree, and the whole performance is finished in about five seconds or less.

In some cases the lax and thin abdominal wall allows of the spleen being more or less fixed against the lower ribs by inserting the hand under its edge and pressing firmly upwards and outwards, and in these cases inspiration need not be employed. The cases where danger may occur are those which are very nervous or very young ; my small experience does not seem to point to advanced anæmia being a cause of danger ; many patients punctured were extremely anæmic. In such cases should sudden expiration take place, it is of the utmost importance, I believe, to hold the syringe very loosely, so that the movement of the syringe in the direction of the long axis of the spleen is in no way hindered, and thus the needle with the spleen is not fixed ; if held firmly and fixed, the needle is very liable to cause a rupture of the splenic capsule.

It is, of course, no good giving instructions with regard to holding breath to very young children ; but in several cases expiration occurred in nervous patients ; the hand, however, being ready at a moment's notice to allow of the swaying movement of the syringe prevented any tearing of the capsule, and on the needle again recovering a vertical position it was at once withdrawn without any bad sequelæ. It was found that if the syringe rapidly filled with blood, the chances of finding parasites were small, and the blood usually had more or less characteristics of peripheral blood ; probably in these cases the blood came directly from a splenic sinus.

In a few cases it was found almost impossible to draw off any blood, in one case even after three punctures ; usually, however, enough was obtained, though not sufficient to make a good film. In these cases it was noticed that the spleens were difficult to puncture, but they did not appear to be fibrous in nature. By giving a few slight lateral movements to the needle the splenic pulp is slightly damaged, and blood can in some cases be drawn off, as in puncture of a lymphatic gland, though such a procedure should be avoided unless absolutely necessary.

In three definite cases, and in several that were clinically

certain, the blood withdrawn had to the naked eye the appearance of slightly-clouded serum, though undoubtedly coming from within the spleen itself; this was noted especially in severe and rapid cases of kala-azar.

Usually three films at least were made, and this was found to be absolutely necessary, for frequently the first, and often the second, revealed no parasites, while they were found in the third.

A positive spleen puncture settles the diagnosis, but a negative result still leaves one in doubt. Two cases at Gallabat are mentioned to illustrate this point.

One, a boy, had all the clinical signs of kala azar, a splenic puncture was performed and true splenic blood was drawn, but no parasites could be found. Later, he was again punctured, and after prolonged search a few typical Leishman-Donovan bodies were discovered, altogether entailing over six hours microscopic work, and the diagnosis was not positively settled till I had left Gallabat over a month.

Photographs 4 and 5 show a case that is almost certainly one of chronic kala-azar, for prolonged and heavy doses of quinine had no effect on the fever, which was of a low type, and no malarial parasites could be found in the peripheral or splenic blood before quinine treatment. Anæmia was present, also slight œdema of the legs, and leucopenia with increase of mononuclear leucocytes; there was moreover a history of repeated attacks of diarrhœa. Though punctured on three different occasions, no typical parasites could be found; several atypical ones, however, were observed—*i.e.*, without a blepharoplast. His wife was very wasted and weak, and had been ill with continued fever for five months. She was anæmic, her spleen was enlarged 1 inch, and her liver  $\frac{3}{4}$ -inch, below the costal margin. There was œdema of the legs, but she showed no other signs of disease, and quinine had no effect on the fever. The only child was fat and well, but had a considerably enlarged spleen. I felt sure that the man and his wife were infected with kala-azar, and yet after the most prolonged search no typical parasites could be discovered.

No cases that presented only atypical bodies were included in the list of those definitely diagnosed, though it is a striking fact that these bodies were only found in those with typical parasites, or in cases that were clinically kala-azar. These atypical bodies are illustrated in Plate I., figs. 7, 8, and 9, and in Plate II., figs. 1 and 2.

In ten cases the parasites were readily found, and the diagnosis settled by a few minutes microscopic work, but the remaining

twelve needed much laborious work before they could be demonstrated. Leishman's stain in tabloid form, supplied by Messrs. Burroughs Wellcome and Co., was usually employed, and was nearly always extremely satisfactory when made up with Merck's pure methyl alcohol. On several occasions it was noticed that the stain would not work, but deposited at once; yet the next day, using the same solution, the same distilled water and the same pipettes, the stain worked excellently.

Major Cummins states that the number of parasites found had no relation to the severity of the infection. My experience certainly does not coincide with his, for my cases, which were acutely ill with the disease, practically invariably presented a large number of parasites in the splenic films, and only required a few minutes for microscopic diagnosis, provided that true splenic blood was withdrawn. In contrast to this, the chronic cases presenting prominent abdomens, large livers and spleens, and a low fever, and which could easily be diagnosed on clinical grounds alone, presented very few parasites, and often it was extremely tedious to demonstrate them, and in several such cases there was an absolute failure.

Fifty-six splenic punctures were performed during this tour, and twenty-two positive results were obtained. In thirty-nine cases, which were undoubtedly kala-azar from a clinical standpoint, nineteen showed parasites in their splenic blood—*i.e.*, in about 48·5 per cent. of the clinical cases the parasite was demonstrated.

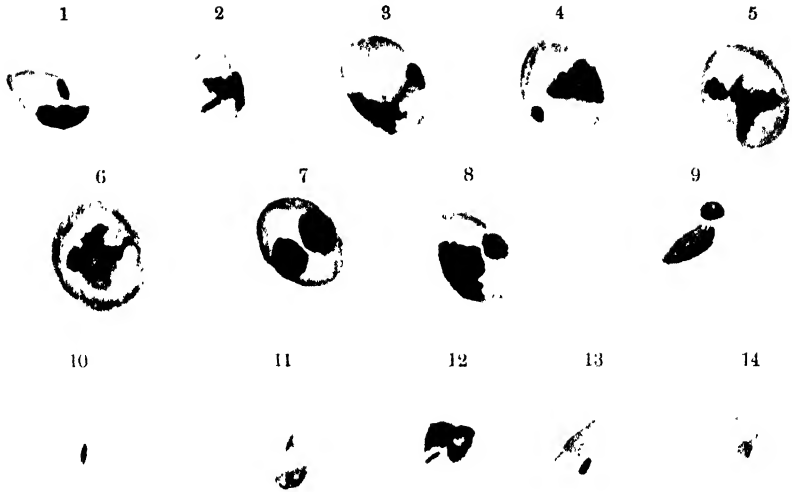
As explained, many hours were often spent over splenic films before the parasite was found, and it is an open question whether, if the same time had been spent over the peripheral blood, the parasites would not have been found in films from it; the time being short, it was considered more advisable to examine blood from the more favourable source.

Very seldom was splenic puncture objected to, though I regret it was necessary to invariably inform the patient he was going to receive some potent medicine into his spleen, otherwise he would never have consented; in the circumstances I think such a statement is truly justifiable.

Other aids to diagnosis, such as the type of fever, the effect of quinine, leucopenia and differential counts, could seldom be employed, owing to the impossibility of following up the cases and to lack of time.

In places where a stay of several days was possible peripheral blood examination was made, and also differential counts in doubtful cases, before proceeding to splenic puncture. I must

# PLATE I.



1-6. Parasites found in chronic case (3 years' duration). 1. Typical Parasite; 2. Slightly degenerate enlarged Parasite; 3-6 are believed to be further stages in the degeneration of the Parasites within the body.

7-9. Forms only seen in chronic cases. Apparently, Parasites in which the blepharoplast becomes in size and staining the macro nucleus, unless it be a divided macro-nucleus.

10-11. Degenerate forms found in very chronic cases (5 years' duration).

12-14. Degenerate forms found in case (2 6 months' duration).

These forms were found frequently in long standing apyrexial cases, which presented typical symptoms and signs of Kala-azar, and are believed to represent degenerative processes occurring in the Parasites within the body.

# PLATE II.



1-2. Parasites similar to those depicted on Plate I.

3. Parasites showing curious division of blepharoplast.

4. Parasites found in leucocyte in the peripheral blood.

To illustrate "A Tour of Investigation as to the Prevalence of Kala-azar in Kassala and Blue Nile Districts, Sudan, from January 12th to May 16th, 1909."

By Captain L. BOUSFIELD, R.A.M.C.



admit that even after a differential count, without the other aids I was almost as much in the dark as before.

Appended is a table giving a few results—four from kala-azar patients, four from very suspicious cases, and one from a very chronic benign tertian case (see photographs 2 and 3).

Cases	DIFFERENTIAL COUNTS								
	Kala-azar				Suspected kala-azar				Chronic malaria (1)
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	
Finely granular poly morphonuclear	25.5	60	28	45	27	44	43	54	52
Coarsely granular eosinophile	15	—	—	2	1	1	2	1	1
Large mononuclear ..	32	18	30	16	25	23	23	21	12
Lymphocyte .. ..	40.5	20	24	34	47	29	29.5	22	35
Mast cell .. ..	0.5	—	—	—	—	1	0.5	1	—
Transitional .. ..	—	2	—	3	—	2	1	1	—
Free nuclei .. ..	—	—	15	—	—	—	—	—	—
Megaloblast . . .	—	—	3	—	—	—	—	—	—

This list gives some idea of the results obtained, and from its perusal it is evident that not much reliance could be placed on the differential counts. In some cases the finely granular polymorphonuclear count in kala-azar was high, but usually low, between 30 and 45 per cent.

The percentage of large mononuclears was usually high, but varied greatly; it is always a matter of difficulty to classify the small and large mononuclears, for so many intermediate types are seen, and the results vary with the observers' ideas.

In Case 3 of the kala-azar patients many apparently free nuclei were observed; this was observed in several other cases, but the numbers were not noted.

The chronic malaria case showed no malarial parasites in the peripheral blood, which was examined on two occasions, but the splenic blood contained many benign tertian rosettes.

Malarial parasites were not found in a single case of kala-azar, either in the peripheral or splenic blood, and in the suspected cases only in four instances. Considering how extremely common malaria is, this is very remarkable, and I can only suggest that it is a case of the survival of the fittest. The weaklings dying off from malaria in early childhood, those with stronger constitutions surviving and growing up gain an immunity, so that although suffering from malaria during the rainy season, yet they are capable of ridding their general circulation of the parasites when

once the malarial season is over, in spite of their not taking quinine.

This tour was made during the non-malarial season. In several cases the peripheral blood was watery and spread on the slides extremely badly. In three virulent cases it resembled cloudy serum microscopically.

The type of parasite usually encountered was the typical one now so well known as to need no description. Most of the forms were free and well developed, but in cases where difficulty was found in discovering them it seldom occurred that only one was seen; usually in the immediate surroundings of the field others could be found, while the rest of the slide was barren.

In chronic cases it was frequently extremely difficult to demonstrate the parasite, though on several occasions structures were seen, which I believe to be degenerated parasites. These are illustrated in Plate I. The cytoplasm in these bodies was often degenerated, staining badly, often taking a reddish tinge and showing granulation and excessive vacuolation; the macronucleus was often ill defined and faintly stained, the blepharoplast (?) diffuse and staining like the macronucleus.

These, however, appeared to be parasites owing to their definite borders, the protoplasm staining blue and containing a chromatin mass, and what appeared to be an altered and degenerate blepharoplast. These changes were never noted in the smaller and younger parasites, nor in those of virulent cases. Excessive vacuolation was seen in parasites after a single injection with orsudan (see Plate III.).

Further, in chronic cases, parasites (?) were found which showed no signs of a blepharoplast as usually seen, but two more or less equal chromatin masses usually equally deeply stained—sometimes one, usually the smaller, somewhat more deeply coloured (see Plate I., figs. 7 and 9, and Plate II., figs. 1 and 2). Such structures were only seen in kala-azar cases, or those clinically like this disease. Is it possible there may be a sexual form, possibly one of conjugation? These forms did not appear degenerate like the others already described.

Fairly frequently parasites were observed of about the diameter of a normal red corpuscle, sometimes quite circular in outline, but typical in the possession of nucleus and blepharoplast, but the cytoplasm was more granular and vacuolated than in the younger oval forms. One parasite seemed to be within a red cell and appeared to be exactly in focus with the edge of corpuscle, but since this was the only one seen in a very large number of films,

# PLATE III.



1 -4. Leishman Parasites after one injection of orsudan, showing marked vacuolation.

# PLATE IV.



Structures, possibly Kala-azar Parasites, found in an apparently perfectly healthy dog which lived in a compound containing a very virulent Kala-azar case, a woman aged about 22, at Gallabat.

1 - 8. Structures found in smears from spleen.

9 - 11. From liver smears.

12 - 16. From mesenteric glands which were much enlarged.

17. Only structures in any way resembling a Leishman Donovan body found in the kidney smears.

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it is probable that it was superimposed. Parasites within cells were not seen with any great frequency.

In only two cases were parasites found in the peripheral blood, in one case free, and in the other free and in phagocytes; no attempt was made to find parasites in centrifugalised blood. The peripheral blood of one case was taken with the idea that the case was probably malignant malaria, but some free Leishman-Donovan bodies were found. This man gave a history of only fifteen days fever, with good health previous to the attack.

Occasionally a parasite with a bi-partite blepharoplast was observed, in one case the adjacent ends of this divided micro-nucleus were distinctly enlarged (see Plate II., fig 3).

The "urmoot" fish, which exists in large numbers in the pools of the River Rahad, from which the population of Mafaza draw their water supply, was examined and blood smears made from the heart's blood, liver, spleen, and also with intestinal contents, but nothing like a Leishman Donovan body in the human body was found.

Camels' blood was examined on two occasions, but nothing abnormal was noted.

*Bed-bugs* (*Cimex lectularius*) were dissected on several occasions and smears made from the foregut and salivary glands, midgut, and the hind gut with reproductive and malpighian glands.

One bug was full of blood which had been sucked from a woman suffering from virulent kala-azar.

Considerable practice and previous experience is required for this work, and without such knowledge it is difficult to say what is normal or what is abnormal in the microscopic specimens. Nothing definite was found, though in the midgut (of the one from the kala-azar case) two possible parasites were seen and possibly a sporocyst. A fair number of eosin staining spirochæte-like bodies were also seen.

Two dogs were killed and smears made immediately from the spleen, liver, kidneys, mesenteric glands, and heart's blood—

(1) A dog, male, about 4 years old, belonging to an extremely acute case of kala azar and living in the same tukl with the patient, was killed and examined at Gallabat.

It was very well nourished and exceptionally clean for a native dog. No parasites were found.

Nothing abnormal was noted in the organs except that the mesenteric glands draining the small intestines were greatly enlarged and of a deep maroon colour, while the two largest appeared lighter in colour, and as though they were about to break

down and suppurate. The intestines drained by the glands showed no microscopic disease.

Smears were made from the spleen, liver, kidneys, and mesenteric glands, and a few structures were found which were extremely like Leishman-Donovan bodies (see Plate IV.). It is impossible to say definitely what these are, as films only were made, and it was quite impossible to attempt any cultures.

Very few bodies, scattered here and there, could be found in the films, and in the kidney films only one was found after prolonged search.

All that can be said is that these structures have a striking resemblance to kala-azar parasites, and work should be carried out on dogs in the Sudan.

(2) A dog caught at Kassala wandering about the town. It was extremely emaciated, and many ticks were fixed near the genitals and in and around the ears, no other parasites were found.

No gross disease was noted in the internal organs, but the spleen was enlarged and pale, and scattered over its surface were a number of milky patches, apparently local thickenings of the capsule.

The intestines were practically empty. Smears revealed no parasites except filariæ in considerable number in the liver and spleen (see Plate V.) Nothing in any way resembling a Leishman-Donovan body was seen.

I wish to thank all who most kindly assisted me in my investigations, often at the expense of considerable trouble to themselves, and to record that every help and courtesy was afforded me by the English and Egyptian officials and the medical officers, amongst whom I would specially thank El Sagh, Mohammed Eff, Ali Niklawi, Sudan Medical Department, who gave me much assistance and information and kindly sent me several detailed reports on the cases at Singa and from whom I hear that one more proved case and two more clinically certain have come to light since my visit at Singa, and thus the total number should be raised by three, one proved and two highly suspicious.

#### APPENDIX.

Unidentified bodies were found in the splenic blood of a case suspected to be suffering from kala-azar.

The history of the case was as follows.—

An Arab, aged about 35, had lived all his life at Tukeleim, near the Atbara, near Gallabat. He had been ill two or three months with cough and stated he had at times expectorated blood. He was very thin and wasted. There was no other history of illness.



PLATE V.



*Filaria*, probably *Filaria immitis*, found in a very emaciated dog from Kassala. Many filarise found in smears from spleen and liver. Deep Leishman's staining. *a*, cephalic end; *b*, transverse break; *c*, sheath; *d*, V spot; *e*, central viscous; *f*, tail spot; *g*, transverse striation well shown; *h*, head as seen in another specimen.

PLATE VI.



Structures found in spleen blood from case at Tukelein, man aged about 38.

1. Normal red cell.

2-8. ? Parasites. No intra-corporcular forms found. Distributed about the slides, but usually more or less aggregated together.

7-8. Found lying together as drawn. Short detailed account of case given.

To illustrate "A Tour of Investigation as to the Prevalence of Kala-azar in Kassala and Blue Nile Districts, Sudan, from January 12th to May 16th, 1909."

By Captain L. BOUSFIELD, R.A.M.C.

and he stated he had never had fever, but when seen at 10 a.m. his temperature was 100·2° F.

*Family History.*—His wife had died three months previously after three months continuous fever. She had no dysentery, cough or expectoration of blood. His boy, aged about 5, was said to be quite well, but on examination both the liver and spleen were found to be considerably enlarged and his temperature was 100 1° F. The father and the child himself said he had not been ill with fever. The lungs and heart appeared normal.

*Physical Examination.*—Marked wasting and general weakness. Patient evidently seriously ill. Slightly anæmic. Conjunctivæ not yellow. No œdema. No physical signs of lung or heart disease. Spleen enlarged one inch below the costal margin. Liver not enlarged. A splenic puncture was performed, but very little blood could be withdrawn and the slides were made with difficulty. Microscopical examination revealed neither kala-azar nor malarial parasites, but some curious bodies were discovered which are drawn in Plate VI. The films were bad, many red cells were distorted, but in these intra-corpuscular bodies could be found. It is greatly to be regretted the case was only seen once and no peripheral blood taken. Further, the films were not examined till the next day, as my microscopical apparatus had to be left behind owing to the difficult and stony track from Gallabat to Tukeleini.

Possibly these structures are hæmogregarines. The average length was 3 to 5 $\mu$ , breadth about 0·5 $\mu$ . The central portion was nearly always narrower than the extremities, which were rounded. The outline was definite, the protoplasm stained blue and contained a nucleus which usually extended completely across the structure. No chromatin dots were noted scattered about in the protoplasm and there was no pigment. No trace of an enclosing red cell could be seen.

Possibly forms 7 and 8 represent vermicules fixed during motion.

Fig. 3 shows a double nucleus, situated in the centre, the smaller lying against the convex border of the parasite in its long axis.

Fig. 6 shows forms very similar in shape to the diplococcus of pneumonia, having blue bodies with definite chromatin transverse bars.

It seems worth reporting this case and drawing the structures, though it is scarcely possible to say definitely what they are, though they appear from their definite borders, staining properties, &c., to be parasites. They are scattered here and there throughout the two films taken.

## THE DISPOSAL OF THE WOUNDED OF STRATEGICAL CAVALRY.

By COLONEL H. G. HATHAWAY.

THE cavalry with an army is divided according to the nature of the duties required of it, into :—

(a) Independent or Strategical Cavalry, for strategical exploration.

(b) Protective Cavalry, for the provision of the first line of security.

(c) Divisional Cavalry, forming part of a division of all arms, for scouting in connection with the infantry advanced, rear or flank guards, or outposts, or for inter-communication purposes.

The arrangements that have been made in the several armies of the world to bring the wounded of their cavalry in touch with the medical assistance behind the regimental medical establishment vary considerably.

From a careful study of them all, one is inclined to consider that most of them are adapted to the requirements of divisional cavalry, assisting the infantry in the immediate protection of the division, and to the requirements of protective cavalry which is adapting its movements to suit those of the force covered—that is to say, for cavalry in co-operation with other arms in the battlefield.

For the independent or strategical cavalry, which must not be tied to the army, an effective scheme for the disposal of the wounded is much required.

In some armies no special provision whatever is made for the wounded of cavalry; in others it is so inadequate that it would almost appear that the necessity for the disposal of the wounded of strategical cavalry is not realised, or is considered of too complex a nature to deal with.

Let us examine the duties of strategical cavalry to see what special medical arrangements are required. I quote the Regulations of Cavalry Training, 1907, for the benefit of those who may not have studied them recently: "The value of cavalry is greater now than at any previous period. The wide fronts on which armies operate, and the large number of troops that are employed, make it more difficult to make any change in dispositions that have once been made. Advanced reconnaissance to clear up the strategical situation, and protective reconnaissance to cover the movements of one's own army, is therefore more necessary than ever."

"The characteristic of cavalry is the power to move with rapidity and cover long distances in a comparatively short time."

"Independent or strategical cavalry will push into the zone separating the two armies," so it must go long distances. "The first duty of the independent cavalry will usually be to obtain a victory over the hostile cavalry, which may be in the zone in which it is required to operate," so wounded may be expected. "Its next duty will be to break through the line of hostile covering troops and discover the whereabouts of the enemy's principal columns, and the direction of their march. For this, concentration of force is essential"; so there may be many wounded.

"Independent cavalry must have complete liberty of action, and must not be tied to the army."

"The independent cavalry may have to work round the enemy's flank."

"Owing to the rapidity at which cavalry move, and the evils resulting from mingling mounted men and wheeled vehicles in the same column, it is inadvisable that the whole of the first line transport should accompany units of the independent cavalry. Such portions as are not essential for immediate action should be grouped and should follow the fighting column at a suitable distance." The above Regulations indicate that we must be prepared to take over the wounded as expeditiously as possible, so that there may be no hindrance to mobility, and to permit the regimental medical establishment to keep with its unit. The situation is also made more difficult by the fact that the ambulance wagons must keep a considerable distance away from the cavalry. It is this separation of the ambulance wagons from the troops which they are assigned to succour, that makes it quite useless for the Royal Army Medical Corps *personnel* to be carried in the ambulance wagons, for under this arrangement there is a wide gap between the regimental medical establishment of the units and the cavalry field ambulances.

The closing of this gap is, in my opinion, the first essential for the successful handling of the wounded of cavalry. The *personnel* of the cavalry field ambulances should be brought forward to fill this gap, and when once the wounded have been taken over from the cavalry it matters little that there may be delay in the approach of the ambulance wagons.

In the handbook of the Medical Services of Foreign Armies I can find only one nation—America—providing that all privates of the hospital corps will be mounted when serving with mounted commands.

It would be quite sufficient if about sixteen men of the bearer division of each cavalry field ambulance were mounted for work with independent cavalry and protective cavalry operating at

some distance from dismounted troops. But the insuperable difficulty presents itself in the great scarcity of horses; fortunately, we have a very useful substitute in the bicycle, which for the purpose required has many substantial advantages.

The Regulations state that cyclists should be employed instead of mounted messengers, a rational system of communication towards the rear, whereby horseflesh is saved, being particularly important in the case of strategic cavalry.

There is no doubt that a cyclist can easily keep touch with cavalry, even making allowance for the detours consequent upon the necessity of the cyclists usually following the roads. The cyclists take over the wounded and send back a message to the ambulance wagons directing where they are required. Light stretchers would be carried on the bicycles, so that the wounded could be transported to some spot where the wagons could take them up. The ambulance wagons might often have to travel long distances, so in many ways it would be a great advantage if they could be mechanically propelled.

The wounded could usually be carried to and from the vehicles on the road, but if this were not always possible, judging by the results of recent experiments, it seems that there is little difficulty in the vehicles following the troops when they leave the road to move across country, or by unmetalled roads. A system could be instituted by which suitable motors which are being used as tradesmen's cars, or cabs, should be taken up for war purposes, when they can either be used without alteration or the commercial body could be lifted off and accommodation suitable for carriage of wounded substituted, the necessary fittings being kept in readiness by the Ordnance Department.

Mechanically-propelled vehicles being capable of carrying wounded comfortably for long distances in a comparatively short time should be of immense value also in evacuating field ambulances, thereby removing one of the greatest difficulties that clearing hospitals have to contend with when troops are advancing rapidly.

A sufficient number of the Royal Army Medical Corps cyclists would be forthcoming immediately, for there are many in each company (at Headquarters, No. 6 Company, Cosham, forty-six N.C.O.'s and men are able to ride bicycles; seven of this number have their own machines). A conclusive test of the value of the scheme could be made by Regulars and Territorial Force at practically no expense to Government beyond a small allowance to men bringing their own machines.

## MOBILISATION AND THE QUARTERMASTER.

By A QUARTERMASTER.

*Royal Army Medical Corps.*

MOBILISATION is a long word, but it has no terrors for those who "during peace study war," or, in other words, the man who prepares himself for the duty he may be called upon to perform will have no uneasiness should that call be made.

In this paper I venture to lay down "general principles" for the information and guidance of quartermasters on the subject of mobilisation, remembering always that changes are frequent, that new regulations are issued *and sometimes overlooked*, that what is to-day is *not* to-morrow; but, withal, there is only "one spirit of the regulations" which, if understood, guides and directs, even when the context is unknown. We know also that different men have different ways of carrying out instructions, which lead to slight divergence of method, though in the main "unity of system" prevails. I therefore submit this paper on general principles, believing that if a man knows thoroughly what he has to do his common sense will not lead him very far astray in the doing of it.

We cannot commence better than by clearly defining the quartermaster's position in the unit. It is scriptural instruction that no man can serve two masters; so our quartermaster, while fully recognising the military claims of his seniors, feels answerable solely to the commanding officer for the performance of his duties. He is in the position of a staff officer to his commanding officer in matters relating to the obtaining of military supplies of all description. The interior economy of the disposition of these supplies is another matter: the quartermaster produces the meat, others say whether that meat shall be boiled, baked, or fried. He is responsible for quantities, not quality. If he is required to obtain 100 eggs, his duty is performed whenever he produces those 100 eggs, whatever the inside may be like. A clear understanding of this position will, I know from experience, save much friction—that bitter enemy to efficiency—and as it has an indirect bearing on mobilisation, inasmuch as a mobilised field medical unit, not existing as such in peace, is composed of a *personnel* practically entire strangers to each other, it is necessary that every man should, from the beginning, know his position and the nature of his duty, and in this paper I am dealing with the quartermaster's duties solely. My remarks are, therefore,

I think, relevant to the subject. The unit is a machine; the commanding officer is the chief engineer; the hesitating wheel responds to the oil-can of the engineer, not to the efforts of the piston rod, though the action of the one is essential to the working of the other.

We will divide our paper into the following headings :—

- (1) The posting to war units during peace.
- (2) The scheme or local mobilisation orders.
- (3) The assembly of the *personnel*.
- (4) Arrangements for housing and feeding on arrival.
- (5) Nature of stores to be drawn and method of drawing.
- (6) Embarkation.

#### (1) THE POSTING TO WAR UNITS DURING PEACE.

Having received notification of the exact unit to which he will be attached on mobilisation, the quartermaster will first, from "Mobilisation Instructions Army Medical Service," learn all about his unit—the source from which the *personnel* is obtained, where the clothing of reservists and specially enlisted men, the ordnance and medical equipment, the medical comforts, &c., are stored. If possible, he should visit these places and see for himself the order and regularity which exist; the impression formed will do good by creating a proper sense of the seriousness, from a national point of view, of all those preparations which many, unfortunately for future efficiency, regard too lightly.

He is justified, in an unofficial way of course, in communicating with the commanding officer, whose name has been notified to him, on matters connected with the mobilisation of his particular unit, and bearing on the remarks which follow in this paper. Secondly, he should study carefully the mobilisation store table of his particular unit (A. F. G., 1,098 Series), and so get fully acquainted with the names and character of the stores, and the purpose for which each article is issued. Thirdly, he should study that part of the "Field Service Manual" relating to him.

#### (2) THE SCHEME OR LOCAL MOBILISATION ORDERS.

The scheme, or "local mobilisation orders," is of course of a confidential nature, but we may discuss its object without exposing its contents. The commander of a field unit, or other officer deputed by authority, is required to draw up in peace time a scheme for the mobilisation of his unit; otherwise it does not require much wisdom to foresee confusion. Here the quartermaster will find,

ready prepared, requisitions for supplies, temporary barrack and ordnance equipment for use during the transition period from peace to completed mobilisation (the mobilisation equipment must not be used during this period). A time-table for the drawing of the ordnance equipment and a plan for each day's work are usually included in the scheme; the quartermaster does not prepare this scheme, but it is as well that he should know of its existence, and of that part which relates to his duties.

Those special articles of clothing and necessities which are not stored by the corps during peace, but are required by the units embarking, will be supplied at the place of mobilisation. (Table II., Clothing Regulations, part 3.)

Mounted service clothing for warrant officers will be obtained, if possible, from a unit at the station, or indented for from the clothing dépôt supplying the district.

### (3) THE ASSEMBLY OF THE PERSONNEL.

With the assembly of the *personnel* commences the actual work of the quartermaster in connection with his new unit. The men will arrive at the place of mobilisation fully clothed and equipped, with the exceptions noted above; and if our quartermaster has followed the instructions under the heading, "Posting, &c.," he knows just where these men were clothed, and whence they came. He will have looked into all the arrangements for the storage of regimental and personal baggage to be left behind by the unit. Reservists and specially enlisted men make their own arrangements for disposal of plain clothes, &c.; they are at liberty to leave them in this store at their own risk.

The quartermaster will receive from the orderly room all I. and R. vouchers connected with public clothing (A.F.H., 1,150) and equipment (A.F.G., 1,033) of the men. The signed, or receipt, vouchers he will retain for his own information; the unsigned, or issue, vouchers he will prepare for his commanding officer's signature, and return them to the issuing officer in acknowledgment of the articles. He will deal similarly with all vouchers received from the Ordnance and Royal Army Clothing Department. The quartermaster's attention is specially directed to Chapter VII. "Field Service Regulations," Part II.

### (4) ARRANGEMENTS FOR HOUSING AND FEEDING.

I think I ought to have written this paragraph before the preceding one, but as it follows so closely perhaps the continuity of our work will not be broken.

In our remarks on "the scheme" we spoke of certain arrangements being prepared in readiness; the housing and feeding of *personnel*, men and horses, is one of them; immediately on arrival at the place of mobilisation the quartermaster—who has probably preceded the remainder of the *personnel*—will go into this matter and draw the temporary stores referred to above, if not already done.

Unless otherwise ordered, Field Service rations will be issued to the *personnel* from the first day of mobilisation, which is the day following that on which mobilisation is ordered: I am writing here of "general," not "partial," mobilisation. The demand will be made on the ordinary A.B. 55 in general use, and the scale, as everybody knows, is to be found in the allowance regulations. Practically—although I have no authority for saying so—the requisition will also be the accounting return. If time, however, admits, the ordinary peace returns, A.F.F. 718, supported by O. 1,640, A.Fs.F. 719-727-776, &c., will be rendered in connection with supplies before the unit embarks.

#### (5) THE NATURE OF THE STORES TO BE DRAWN AND METHOD OF DRAWING.

The stores to be drawn differ slightly according to the nature of the unit mobilising, but the system is practically the same in each case. They comprise:—

(1) Ordnance equipment, held by Army Ordnance Department: see "Regulations for Mobilisation."

(2) Hospital Clothing and Necessaries, by Royal Army Clothing Department: see "Clothing Regulations," part III.

(3) "Medical and Surgical Equipment," by Army Medical Department: see "Mobilisation Instructions," Army Medical Service.

(4) Medical Comforts (as for Medical and Surgical Equipment).

(5) Veterinary Equipment, held by Army Veterinary Service and issued under arrangements made by the Principal Veterinary Officer: see "Regulations for Mobilisation."

(6) Regimental Supplies, by Army Service Corps: see "Regulations for Mobilisation."

From the "Regulations for Mobilisation" it will be seen that, not only is there a "general" and a "partial" mobilisation, but also a mobilisation for "Home Defence" and a mobilisation for "Service Abroad."

In the former case—i.e., "Home Defence"—these stores would, if the mobilisation took place at the station where the equip-

ment is held in readiness, be drawn personally, and it would be the duty of the quartermaster (acting always under the orders of his commanding officer) to see that all necessary transport and fatigue parties are duly demanded, and that they arrive at the mobilisation store at the appointed hour. *Remember that stores are drawn by time-table, and that you are doubtless only one of several units drawing on the same day.*

As the greater part of these stores is either packed or baled, the ordnance count will be accepted as correct, for time would certainly not admit of careful checking; but this will not prevent you from counting your bales and packages and making a note of their several marks or numbers. When we get back to camp or barracks we can take a more careful survey of these stores, if time permits, which, to say the least, is doubtful.

If the unit is one having transport attached, like a field ambulance, the quartermaster should hand over the wagons and harness and the articles pertaining thereto to the Army Service Corps. The fitting of harness, the equipping of wagons by inventory—A.F.G. 1096 Series (if these forms are not available, see Appendix XIV., "Equipment Regulations, Part I.)—are duties which should be performed with the utmost exactness—and though the Army Service Corps are the experts, it behoves the quartermaster, in the absence of a transport officer, to know something about these things.

The medical and surgical equipment, medical comforts, and veterinary stores will be drawn in like manner from the places where they are held, or otherwise obtained according to the regulations governing the circumstances. As regards the stores mentioned, no requisitions are needed, but receipts will be given. Saddlery for officers' horses, not being included in mobilisation store tables, should however, I think, be demanded on A.F.G. 997, and this requisition should be submitted without delay; the requisition, even if not required, can do no harm and will insure delivery.

If mobilisation takes place at a distance from the mobilisation store, then the equipment (that is, the ordnance equipment) will be drawn by a party sent from the unit, and this party will accompany it to the place of mobilisation.

In the event of mobilisation for service abroad, it is highly probable that all stores will be sent to port of embarkation for shipment with the unit, and all the quartermaster has to do is to see that it is present and, if possible, see it loaded and note its position in the hold: the information will be of use on disembarking.

There will be someone present to hand these stores over in bulk, and he will require a receipt from the officer commanding before the ship sails. It might even happen that, under exceptional circumstances, the *personnel* would sail in one ship and the stores be sent in another; even so, the final aim—viz., the readiness of the unit to take the field when required to do so—will not be affected. The main thing is, the quartermaster knows exactly what he has to get on behalf of his commanding officer, and where and how to get it under normal conditions. His first action would naturally be to make full inquiry on these points; if circumstances arise, however, necessitating a departure from the usual routine, the authorities will notify and in due course the officer commanding will receive full instructions.

I have purposely left the question of regimental supplies till the last. We may, with all due respect, call these the indefinite stores; that is, stores which are not—like those previously referred to—held and labelled ready for issue to a particular unit. I think it wiser, therefore, to say nothing about them. Our quartermaster will learn more from a five-minute interview with the officer in charge of supplies than I can tell him here; but he should not wait until mobilisation renders everybody more or less too busy to answer questions. He can also read up the mobilisation instructions on the subject.

#### (6) EMBARKATION.

Having made all his arrangements for transport of baggage, &c., from camp or barracks to railway station (if necessary), and disposed of, the temporary stores previously referred to, he has little else to do, for a time at least. On arrival at the ship he will see his regimental baggage safely stored on board, take over the ship's stores for his *personnel*, and—subject to my previous remarks *re* stores in general—take a well-earned rest. We have now nothing to do but to wish him God-speed, a pleasant voyage, and a safe and speedy return.

NOTE.—To the majority of quartermasters this paper contains nothing new. My excuse for writing is that I write for beginners in the race, not for those, who, like myself, are on the last lap. We are, however, none of us, beyond instruction.

## Clinical and other Notes.

### VACCINE TREATMENT OF MALTA FEVER.

BY CAPTAIN J. C. KENNEDY.

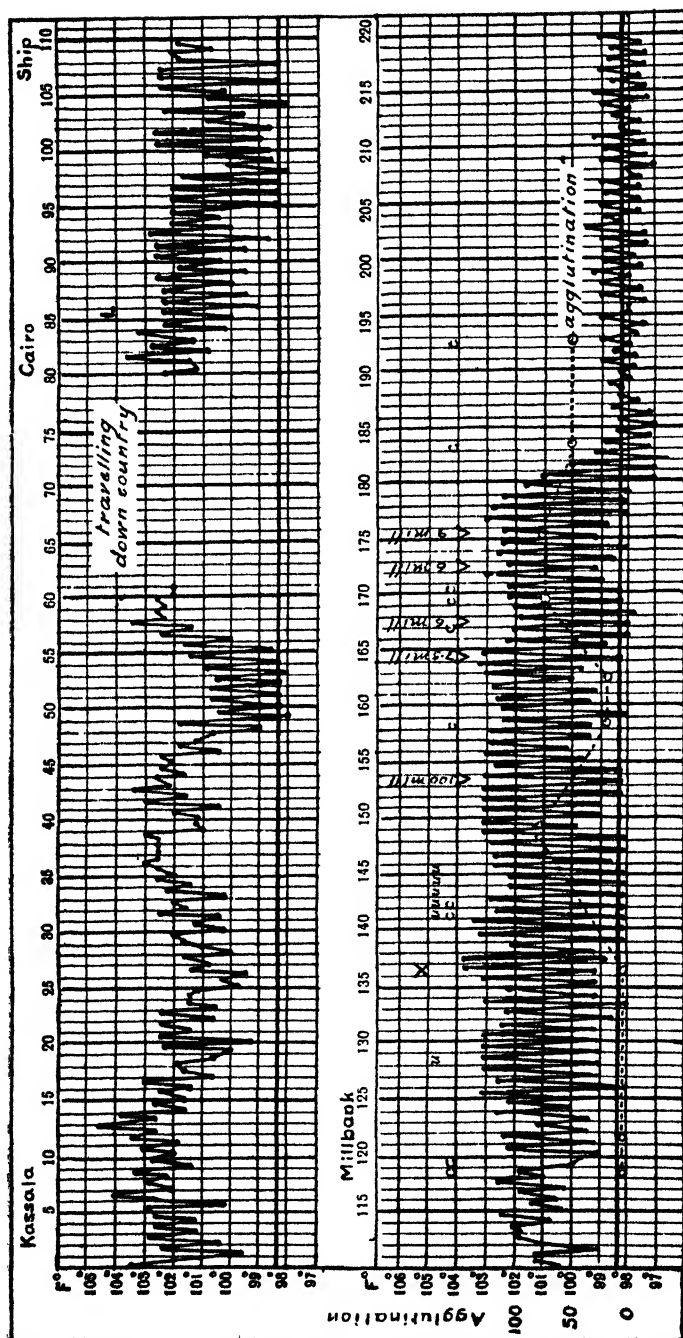
*Royal Army Medical Corps.*

IN the Journal of September, 1909, I reported a case of enteric fever successfully treated with typhoid vaccine, and mentioned that I was treating an intractable and prolonged case of Malta fever on the same principles.

This case I now report, and its interest lies not only in the result of the treatment, but also in its epidemiological and clinical features, which, however, I shall state as briefly as possible.

Captain ———, an officer in the Egyptian Army, fell ill at Kassala,<sup>1</sup> Soudan, on June 1st, 1908. The disease was probably contracted while on trek in the Hadondoa country. He remained at Kassala for two months before he could be transported down country. His temperature ranged high, and was of an undulant character (see chart). He arrived at Cairo on the eighty-first day of his illness in a very weak state—emaciated, with enlarged liver and spleen, a tendency to diarrhoea, high temperature, and profuse night sweats. A blood-count gave red cells 4,145,600, and white 6,400 per c.mm., with 39 per cent. polynuclears, and 33 per cent. large mononuclears. The agglutination reaction was positive to *Micrococcus melitensis* in dilution 1 in 200. The case was therefore diagnosed Malta fever, but in view of the blood count and large size of liver, the possibility of kala-azar infection was also considered. Liver puncture was performed, but no Leishman bodies were found either in smears or in culture; on the other hand, the *M. melitensis* was isolated in culture. The large proportion of mononuclears was probably due to previous severe malaria. He was subsequently invalided home, and arrived at the Queen Alexandra Military Hospital, London, on the 119th day of his illness. His condition was as follows: Very emaciated, but had gained eight pounds in weight during the last month, appetite good, tongue furred, bowels loose, diarrhoea rapidly brought on by the least excitement, and the stools contained much undigested food. He had shooting pains and stiffness in shoulders and arms. The lungs were normal; heart sound but weak. The liver was enlarged to the level of umbilicus and slightly bulging and tender on pressure at the level of eighth costal cartilage. The spleen was enlarged to 1½ inches below the costal margin.

<sup>1</sup> Probably the same case as Captain Bousfield mentions in THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, December, 1908.



L = Liver puncture. "M.M." isolated  
 X = Blood culture. "M.M." isolated and vaccine prepared.  
 V = Vaccine administered.  
 c = Blood count.  
 u = Urine culture. "M.M." not recovered.

Blood count: Leucocytes, 7·950 per c.mm.; differential count, polynuclears, 60 per cent.; lymphocytes, 18 per cent.; large mononuclears, 7·5 per cent.; small mononuclears, or atypical lymphocytes, 14 per cent.; eosinophiles, 0·5 per cent.; hæmoglobin, 90 per cent.

The blood serum gave no agglutination with killed emulsions of two strains (Malta and Soudan) of *M. melitensis* even in a dilution 1 in 10. Cultures of small quantities of blood gave no growth.

The treatment in the first place consisted of tonics, attention to digestion, and relief of pain. The absence of agglutinins is well worth noting. Previous experience had taught me that long-continued chronic cases, such as the one under consideration, with fever of an intermittent type, almost invariably give very slight agglutination; but I was hardly prepared for such a complete absence. The observations were repeated on several occasions and carefully controlled, but always with the same result.

The case was now of the type which I have elsewhere classified<sup>1</sup> as chronic remittent. This type of case is one of great difficulty to treat and its sequelæ are as a rule most severe, frequently crippling the patient for many years afterwards. Such a case suggests that the patient's immunising mechanism has been overstrained and requires stimulation.

I therefore resolved to try the effect of a vaccine, and to this end drew off 7 cc. of blood from the median basilic vein on the 137th day. Ten days later I recovered a pure culture of *M. melitensis*. Attempts were also made to isolate the organism from the urine, but unsuccessfully.

A vaccine was therefore prepared from the patient's own strain and the first injection was given on the 154th day (see chart). The dose was 100 million cocci. The result was not very encouraging as the patient was if anything rather worse and the morning temperature showed a distinct rise for three to four days after.

It was evident to my mind that the dose had been too large; therefore, I decreased the dose considerably and administered it frequently. It will be seen from the chart that the first of the small doses was given on the 165th day and consisted of 7·5 million cocci; the second after an interval of two days was 6 million; the third after four days 6 million; the fourth and last 9 million after two days interval.

<sup>1</sup> *Thesis, M.D.Edin.* The following is the classification I use, based on the type of fever:—

Class	Type	Local symptoms and sequelæ
I. ...	Malignant ... ..	Fatal: usually in three weeks.
II. ...	Undulant—	
	(a) Severe ... ..	Moderately severe or mild.
	(b) Mild ... ..	Mild.
III. ...	Chronic—	
	(a) Remittent) ... ..	Usually very severe.
	(b) Irregular ) ... ..	
IV. ...	Other irregular types	Varied.
V. ...	Aborted ... ..	Nil.

The effect on the temperature is strikingly shown on the chart; the evening temperature gradually and steadily fell to normal and never again rose except on one or two isolated occasions when an abscess which subsequently developed gave rise to some local trouble (the abscess had no connection with the site of injection).

The temperature became normal on the 184th day of the illness and thereafter convalescence proceeded steadily though somewhat slowly, as was to be expected after such a prolonged and severe illness, the enlarged liver and spleen diminished in size, and diarrhoea, &c., rapidly disappeared.

About the 215th day a swelling appeared at the costochondral joint of the seventh rib on the left side and developed into an abscess. As the result of opening and scraping this abscess (from which a pure culture of *M. melitensis* was obtained on the 234th day) a sinus formed, which refused to heal, and it was only after excising a considerable portion of the cartilage that the wound healed. This local trouble prolonged the convalescence considerably, but there was no return of a febrile condition. I have seen several cases of costochondral abscess, but never one that gave such trouble in the healing. From the experience gained in this case I should in future consider the advisability of incising the swelling before pus had formed. The agglutination curve is curious. It will be noticed that on the 149th day the reaction reached between 1 to 50 and 1 to 100. This serum was tested with the patient's own strain recovered from his blood, but so also was the serum of the 137th day which gave no reaction. After the first dose of vaccine (100 million) the agglutination fell to 1 to 20, suggesting a negative phase, but rose again after the small doses of vaccine to between 1 to 50 and 1 to 100 and then remained at 1 to 50.

I much regret that stress of work prevented me making a series of opsonic estimations.

In conclusion let me emphasise the point that would seem to be brought out by this case, and one which I laid stress on in my remarks on the treatment of enteric fever by vaccine - that the best results in treatment of an acute infection by vaccine are to be obtained by the administration of a series of small doses at short intervals.

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## THE TREATMENT OF ECZEMA IN THE TROPICS.

BY MAJOR W. D. SUTHERLAND.

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As most of us know to our cost, the treatment of a case of eczema is not always a matter of satisfaction to the physician or the patient; and the more one sees of these cases in the Tropics the less likely is one to rely on any special method of treatment, or to hope for a speedy cure.

What the *causa causans* of eczema is we do not yet know. That

cocci have much to do with the progress of a case of eczema is certain ; but the fact that the vesicles have sterile contents in the earliest stage of their development, seems to indicate that cocci alone are not the cause of the condition. Dyscrasia and diathesis have both been many times cited as the cause, but where the writer had a clear idea of what he meant by either of these terms, it would appear that he carefully ignored all facts save those that fitted into his theoretical demonstration of an obscure problem and its solution ; in too many cases these precious entities have been used to explain *obscurum per obscurius*, as so often has happened, happens, and probably will happen, in pathology.

Acting on the supposition that the "state of the blood" was the root of the evil, in the past nearly all physicians relied on drugs and dietary as valuable adjuncts of local treatment of the affected area. Even to-day there are in France and Britain not a few who still prescribe a more or less rigid regimen for their eczematous patients. There are even some who adhere to the theory that in elderly people a chronic eczema is the less of two evils—if it be cured, and thus as it used to be called "driven in," some internal affection is sure to appear, and may carry off the patient. Of all branches of purely medical work, dermatology, as far as the general practitioner is concerned, has remained more or less where it was forty years ago in Britain.

On the other hand, the German school of dermatology has for long scouted the idea that dietary is of service in eczema, save in so far that a diet composed of pleasingly-prepared, easily-digested food, partaken of in pleasant company is of use to every man. So far as his eczema is concerned, the patient may eat what he likes. The beautiful theory that uric acid is the *fons et origo* of all kinds of skin manifestation does not meet with such enthusiastic recognition in Germany—where they do know something about metabolism—as it does nearer home.

Drugs given with the avowed intention of "purifying the blood," "promoting a healthy action of the skin," and what not, are of no use in eczema. Arsenic does harm in an acute case from its stimulant action on the epidermis.

While, then, no special general treatment is of service in hastening the cure of an eczematous patient, external applications, when intelligently used, will do good even though the patient makes no change in his ordinary mode of life, as to diet.

How may this external therapy best be carried out? First and foremost, we should enjoin upon our patient that he must on no account wash the affected area, even without allowing soap to come into contact with it. He will naturally reply that, if he does not wash the parts, he cannot keep them clean, and that in the Tropics one must sweat in spite of the physician's orders to the contrary.

Washing with water, however, is not the only way of removing the effete epidermal cells, and as it is *the* way which tends to keep up the

dermatitis—as the patient may be taught by carrying out parallel experiments on two portions of the affected area—washing with water must be replaced by other methods of abstersion, such as the use of alcohol (unsweetened gin does admirably) or of boiled and cooled olive oil. The use of oil has the advantage that in many cases the bath may be employed and yet the affected area runs no risk of being wetted. When the affected area is treated with alcohol the patient is often put to it to devise a method of keeping the water from this area when he bathes the rest of his body, but with a little goodwill on his part in most cases he will surmount the difficulty.

If the genitals or anal region be the seat of the affection he must not use a bath-tub, but may, after soaping his body, sluice himself down with water poured from a can. Where it is very difficult, or quite impossible, to devise a method of bathing so as to protect the affected area, then the patient must use oil or alcohol abstersion for the whole body surface. In one case the writer induced a lady to abstain from bathing for a whole hot weather and rainy season in India. She used gin for abstersion and at last the generalised chronic eczema, from which she had suffered for years, was controlled. No one who had seen her skin at the end of that time could have called it “dirty,” in spite of its having been untouched by water for so long.

We cannot, of course, absolutely prevent the sweating, which is the result of climatic conditions, but we may do much to help our patient to avoid the consequences of uncontrolled action of the skin. We may lessen the tendency to sweat, and at the same time promote drying of the fluid that is poured out. While the use of alcohol as an abstergent decreases the action of the sudoriparous glands to an appreciable extent, the use of alcohol, especially *whisky*, as a beverage increases this action. I am inclined to think that grain spirit has more effect than malt spirit in this way, but the safest plan is to veto the “peg.” If the patient will not hear of this, then let him do as little harm to himself as he can, by drinking brandy instead of whisky. That the average quality of the brandy sold in the Tropics is higher than that of the whisky does not appear to be so generally known as it ought to be.

Of course, all exercise that causes sweating must be tabooed; our patient must leave lawn-tennis, hockey, &c., to those whose skin is healthy. A walk in the cool of the morning and evening is enough for him, however ardently he may have worshipped the fetish of “exercise” when well.

To dry up the sweat a dusting powder—such as one composed of equal parts of starch and oxide of zinc—should be freely used. Some are inclined to add to this time-honoured mixture some boric acid. The writer is strongly of opinion that to do this is at best to waste the acid, which might well be used for other purposes. In not a few cases the use of boric acid tends to keep up, if it does not actually increase, the inflammatory condition, and in these cases it is worse than waste to employ it.

The ordinary treatment of an eczema by local means may be summed up in the words "zinc ointment;" but in the Tropics we shall only too soon find that in many cases all salves must be eschewed as of the evil one's invention. The epidermis, overladen with fluid as it is, cannot be made to tolerate oily matter—in the damp climate of Bengal, Madras, and Burma the epidermis is sodden in the healthiest of skins. Where salves are contra-indicated the physician must ring the changes on powders. These may be applied by means of a caster, the powder being "peppered" over the surface; or the patient may wear muslin bags filled with powder, hung so that at every motion some of their contents are deposited on the affected area.

If the eczema be acute, nothing can be done until we have lessened the inflammatory infiltration of the part. For this purpose there is nothing more satisfactory than the use of compresses of acetate of alum solution, covered with oiled silk or gutta-percha tissue to prevent evaporation. The steadily-continued use of these compresses for one, two, or it may be three days will often help the sufferer more than any previously employed means of treatment has done. In the writer's experience it is the cases of eczema genitalium that are specially difficult to treat unless one begins with the compresses. The solution is a 1 to 3 per cent. solution of the *liquor aluminis acetici* of the German Pharmacopœia, which may conveniently be prepared thus:—

	R	Alum sulph.	..	..	..	30·0
		Aq. destil.	..	..	..	80·0
(1)		Solve et adde				
		Acid. acetici dil.	..	..	..	30·0
	R	Calcis carb.	..	..	..	15·0
(2)		Aq. destil.	..	..	..	100·0

Bene concuss.

Into (1) we pour (2) and leave the mixture to stand for twenty-four hours, after which it is filtered. Of the solution thus obtained a 1 to 3 per cent. solution is made with distilled water, and the compresses are wetted every three hours with this. In this connection it is as well to call attention to an axiom of dermatological practice—the more acute the dermatitis the less irritating must the application be, if it is to do good. Many skins will not stand a stronger solution than 1 per cent. at first, and to begin with a 2 or 3 per cent. solution in these cases would only bring obloquy on the physician.

In some cases the part of the body affected is, so to speak, inaccessible for this compress treatment. In such a case we may derive benefit from painting on the part, twice or oftener in the day, the zinc cream which is prepared thus:—

R	Zinci oxidi	..	..	..	40·0
	Glycerini puriss.	..	..	..	60·0
	Aq. rosæ.	..	..	..	150·0

M. bene concuss. stet mist. dies iij., dein fluid. supernatans abjicietur; cremo substrat. utend.

Only once daily the precipitate formed on the affected area so treated is to be removed by means of pledgets of cotton-wool soaked in oil or spirit, used as gently as possible, and then the cream to be again applied. Where the affected surface is very moist we must make shift to powder it, whatever be its situation. The action of the powder is to dry up the moisture and cool the part by abstracting heat from it. The powder should be applied at night, care being taken that the patient is as lightly clothed as is compatible with the prevailing temperature, else he will pass a restless night, even if he has no itching, and as he tosses about in bed will tend to make the powder come on every part save that to which it was applied.

In the hot weather and rainy season he should sleep in light clothing—"Viyella" is an excellent material for sleeping suits—and it should be insisted upon that he does not lie on a mattress. If he does, then that part of his body that is in contact with the mattress will, of necessity, be bathed in perspiration, and when he turns round in bed it will be exposed to the draught of air created by the punkah and undergo rapid cooling; whereas if he sleeps on a sheet all the surface of his body is exposed to nearly the same temperature and no chilling of the surface will take place from change of position. Thin clothing and fairly rapid motion of the air in the room will obviate sweating during the daytime as well as night. The reader may with advantage study the article on "Ventilation in the Tropics" which appeared in the *Lancet* (1909). The lines laid down in that article, which was, the writer believes, written by a well-known Indian engineer, if they be carefully followed, cannot but have a good effect on our patients health, while at the same time giving ease at night to those who have eczema.

If we can use salves for our patient, then the best of these will be probably be found to be this:—

R.	Zincii oxidi	..	..	..	..	
	Amyli	..	..	..	aa	20·0
	Vaselini	..	..	..	..	40 0

M. tere bene.

Vaseline does not tend to undergo decomposition, as does lanoline or benzoated lard, even when it is spread on notoriously unfavourable areas, such as the perinæum, the axilla, &c.

This salve must be spread *thickly* on the part with cotton-wool, the part being then bandaged, or by means of a glass rod and covered with a thick layer of powder—*e.g.*, eczema of the face or neck.

As the case progresses, to the salve may be added some oil of cade (not more than 1 per cent. to begin with) in order to promote healthy action of the skin. If we have been using powder instead of a salve then we may paint the area with Wright's liq. carbonis detergens, which is far and away superior to any of the numerous imitations of it that are on the

market. The solution used should be at first a 1 per cent. solution of the liquor in rectified spirit, but even this may be found to cause too much irritation in some cases. As the treatment goes on the proportion of oil of cade or tar is increased, a little at a time, until at last at least a 50 per cent. solution of tar is well-borne. When there are signs of irritation being caused by the tar its use should be intermitted for a day or two, and then resumed, a solution slightly weaker than that last employed being applied. In this way the distressing itching which is so prominent a symptom of eczema of certain regions is controlled, and in time entirely removed. In order to hasten this consummation, before all things it is necessary to observe two rules: the tar should never be employed until the affected area has ceased to weep, and the patient must refrain from keeping up the condition by scratching.

The hard thing is to refrain from scratching at night, during the times of sleep and slumber. To aid him in his endeavours to carry out orders the patient should have his hands tied at night. A good way of doing this is to have attached to the head-rail of the bed two stout tapes. These are of such a length that when the patient's wrists are in the slip-knots at their ends he cannot, as he lies on his back or his side, reach the affected area with his fingers without putting such a strain on the wrists as will waken him.

Where the skin is cracked the tar will cause so much burning that its use is for this reason contra-indicated, not to mention the fact that when the skin is still cracked the disease has not advanced towards healing far enough for the tar to be of any service as an exciter of keratosis.

Such are the main points to which attention should be paid when we are called upon to treat a case of eczema in the Tropics. Unfortunately, the path of the physician is not made smooth for him by the devices of the pharmacists, as it is in Europe, where many preparations, thought out by Unna and carried out by manufacturing chemists, enable one to make efficient and cleanly applications to the affected area in a manner easily learnt by the patient. Gelanthum, and other ingenious means of medicating the skin, which have been devised by the Hamburg dermatologist, and adopted all over the temperate regions of the world, are not at our disposal in the Tropics. Preparations of gelatine require a certain temperature for their manufacture, and without this temperature of the surrounding air to aid him the skilled pharmacist cannot make an elegant preparation, although he follows the directions given by Unna to the letter. It would be of great advantage to physicians who practise in the Tropics if the pharmacists at home could turn out preparations, similar to gelanthum and "zinc-paint," which would stand the strain of keeping them in the Tropics or, better, if they could so modify their formulæ that the pharmacist in the Tropics could make serviceable compounds of this kind.

Unless one has seen the results obtained in India one can hardly conceive what unpleasant-looking and utterly unusable compounds are all that the most careful compounding gives rise to when gelatine is used as the base.

In not a few cases the eczema will be complicated by the co-existence of acariasis, phthiriasis, or epiphytosis; of these conditions the last-named is the most likely to be overlooked.

For "dhobi itch" painting the affected part with a solution of iodine in iodide of potassium is a good means of cure; but this cannot be employed when the skin surface is raw with eczema. Then one must use mild applications of Vleminckx's solution. This powerful, though offensive, parasiticide may conveniently be prepared by boiling together, until the total volume has been reduced by a third, the following substances: quicklime, 1 part; precipitated sulphur, 2 parts; water, 15 parts. The resulting golden liquid should be applied to the part at night-time so that the deposit which it leaves may remain in contact with the skin and not be disturbed by the friction of the clothing for a considerable time. Three or four such applications in a suitable case will work wonders. In too many cases, however, the "bite" of the solution is so acute that its strength must be reduced, and thus its parasiticide effect is sensibly lessened.

The reader may think that the differentiation of a scabies eczema from an ordinary eczema is easily made. So the writer thought until he met with the case of a young European who had had to do with a European prostitute in Bombay and afterwards suffered from what seemed to be a plain, straightforward, uncomplicated eczema genitalium. The condition did not improve under treatment, although neither the patient nor the writer spared pains to remove all sources of irritation. At last, one day there was seen, in addition to the weeping, infiltrated, and cracked areas on the folds of the groins, scrotum, and venter penis a suspicious-looking pimple on the dorsum penis, which had not been there at the previous examination. This pimple was a scabies burrow, and the case cleared up quite satisfactorily to the physician if somewhat painfully to the patient when anti-acaric treatment was adopted.

The moral of this story seems to be that when we have a case of eczema which resists our treatment in a more than ordinarily refractory way, or is characterised by more than the ordinary amount of itching, the aid of the microscope should be invoked if the physician has not already had recourse to it in his curiosity as to the exact condition of the skin in the affected area.

At least one physician in India has great faith in the use of ichthyol in salves applied to the eczematous area. The writer has had no opportunity of testing the merits of this addition to the timely application of zinc-vaseline to the affected skin, but doubtless some of his readers may

care to try the combination, varying the strength according to the circumstances of the case.

When we have at last brought about a cure of the eczema, how best may we avoid its return?

For long after the last signs—itching and redness—have disappeared, the use of the tar-spirit should be continued, and the parts, which are painted once daily with, perhaps, pure liq. carb. deterg., should be kept well-powdered; this even when things have so far advanced that the general use of water has been resumed.

The use of alcohol as an abstergent should be resumed when the cold season is at an end, the part that was affected should be lightly touched with a small pledget of cotton-wool soaked in unsweetened gin once a day, although the daily bathing of the part is carried out.

In the cold weather—especially when the dry winds blow—the part may conveniently be anointed from time to time with “fetron,” or this substitute therefor: vaselin puriss., 50·0; lanolin, 46·0; ceræ alb. 4·0; all these to be melted together and allowed to cool, and stored. Incidentally, it may be mentioned that this preparation beats the swindling “skin foods” as an unguent for the skin, and costs very much less. It has, like all lanoline preparations, the disadvantage of at least not hindering the growth of the hair on the part to which it is applied. But even one’s female patients do not mind this in the case of certain regions of the body.

The reader will do well to remember that the oftener an eczema has recurred, the more chance of its early return after a cure, and the greater the probability of its becoming chronic. Many chronic eczema cases are, alas! quite incurable, although the physician may do much to make life less unbearable for the sufferers.

### THE “KENNY” STRETCHER PILLOW.

BY MAJOR H. A. HINGE.  
*Royal Army Medical Corps.*

THE Government of India has recently sanctioned the adoption of a very ingenious and useful form of ambulance pillow designed for use with Field Stretchers Marks I. and II., and has allotted the necessary funds for its provision in all nine divisions and independent brigades of the Army in India, including Burma and Aden.

This pillow was first brought to the notice of the military authorities at Simla in 1907, when its superiority over the existing regulation pattern was immediately recognised, and it was not only decided to submit it to a thorough trial in India, but the War Office was apprised of it, and a sample forwarded home for trial.

Both of these trials having proved satisfactory the Indian Govern-

ment has lost no time in authorising the introduction of the pillow, while the Army Council have signified their intention of doing the same. It is also understood that the War Office will in due course bring this pillow to the notice of the St. John's Ambulance Association.

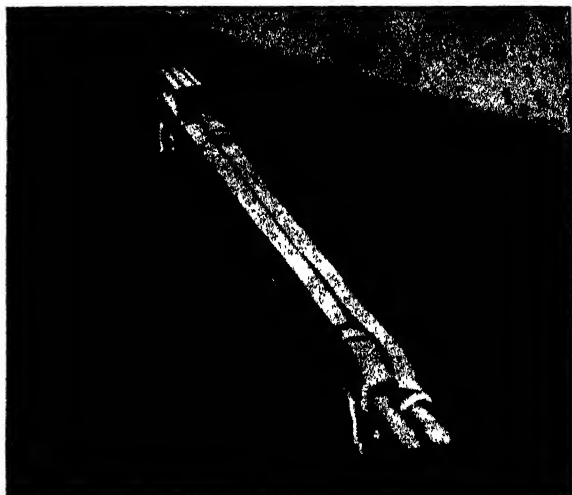
A review of the regulation stretcher pillow hitherto in use, that now authorised, and their respective values may prove of some interest. Both pillows are shown in photographs Nos. 3 and 4.

*Regulation Pillow hitherto in Use.*—This is the ordinary type of pillow, consisting of a canvas casing stuffed with coir, in size about 24 inches by 12 inches by 4 inches, weighing, approximately, 2½ lb. Though it answers its purpose fairly well, this pillow has certain drawbacks which place it at a decided disadvantage, especially on active service, and, in the light of present-day knowledge, it is possibly often a source of danger. Its disadvantages are: Being a separate article from the stretcher it is frequently lost on active service; its bulk precludes it being stowed or carried inside the stretcher to minimise risk of loss; it frequently comes in contact with the ground, and is therefore liable to take up dust, dirt, &c.; the stuffing forms an ideal lodgment for germs and other deleterious matter easily introduced—*e.g.*, the absorption of any discharge from the head or mouth of a wounded or sick soldier; it is liable, after a time, to get hard and lumpy, to remedy which, or to cleanse or disinfect the pillow, it must be unpicked, washed, teased, restuffed, and re sewn, a proceeding that takes much time and cannot always be conveniently performed on active service, but which for obvious reasons is rendered imperative every time it is soiled. Should the pillow get wet, its weight is at once considerably increased, thus adding to the distress of the bearers, on whom every ounce of weight tells, especially on a long march; while the discomfort and possible danger to a patient resulting from lying on a sodden pillow for several hours perhaps, and the tedious process of drying it, are obvious.

*The "Kenny" Pillow.*—This, as will be seen from the photographs, is a very simple and effective head rest, designed on intelligent and hygienic lines. It consists merely of a strip of canvas 36 inches by 9 inches, with three buckles and straps attached to the ends. The canvas is buckled on to two bent metal supports let into the stretcher poles, and so forms the pillow.

The special features claimed for this invention are: (1) Its extreme simplicity in both principle and construction, which render it far more comfortable and hygienic than the existing pattern and devoid of the numerous disadvantages of the latter; (2) its cost is trifling, it has practically no bulk at all and is therefore light and portable to a degree; (3) it is more in keeping with the character of the stretcher, of which it is part and parcel and so cannot be lost, yet is detachable in a few seconds, at will, for purposes of cleansing or repair; (4) it cannot collect, absorb, or harbour dirt, &c., like the present pattern; (5) it always

remains soft, springy, and pliable, adapting itself to the head in any position; it is very freely ventilated, being so arranged as to admit a continuous play of fresh air immediately under the head of the patient,

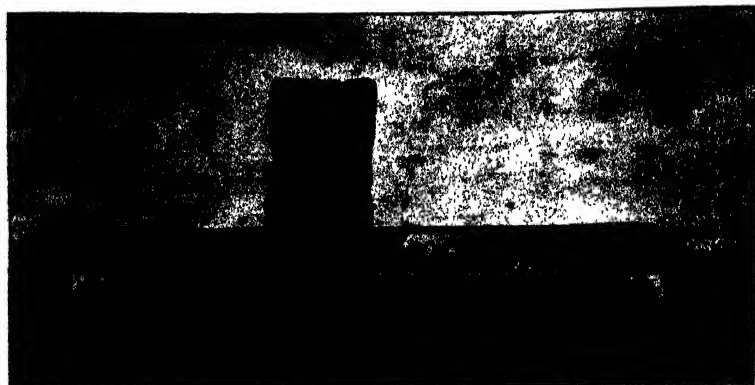


1.—Stretcher closed and ready for transport. Note bulk of pillow.

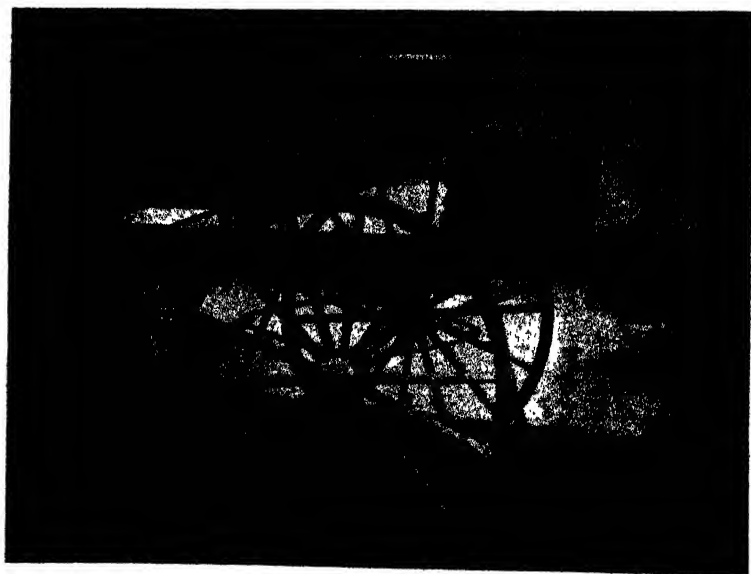


2.—Stretcher opened showing pillow ready for use.

thus rendering the pillow always cool and sanitary; (6) should it get wet, its weight is not increased to any appreciable extent, and the air current dries it again automatically and quickly, while the discomfort and possible danger to a patient is reduced to a minimum; (7) its height and



3.—Pillow detached from supports and shown with regulation pillow, which is in the centre. Note the difference in size between them.



4.—Pillow shown on stretcher carriage, together with regulation pillow.

angle can be adjusted to the liking or condition of the patient without disturbing him, by merely regulating the straps underneath to requirements; (8) it is neat in appearance, compact, and once attached to the stretcher requires absolutely no further fastening or unfastening, except for cleansing, renewal, or repair; (9) it is collapsible, and its action being automatic it is always in position, ready for instant use on the stretcher being opened, and *vice versa*.

In addition to the above, the canvas can in an emergency be utilised as an excellent temporary bandage or splint for an injured limb or trunk, some part of the patient's clothing or equipment being meanwhile extemporised as a pillow. The canvas if detached also lends itself for use as a first-rate arm sling, and forms a very effective straight jacket for use in cases of delirium or violence.

The inventor, a member of the Southern Army Headquarters' Establishment, and late of the 19th (Queen Alexandra's Own) Royal Hussars, has very patriotically made over his invention to the State, unconditionally, for the benefit of the Service.

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### LONG-CONTINUED FEVER WITH MARKED ENLARGEMENT OF THE SPLEEN CURED BY THE USE OF SENEGA.

BY MAJOR N. FAICHNIE AND CAPTAIN J. H. R. BOND.

*Royal Army Medical Corps.*

IN the Journal for December, 1909, appeared an article by Captain H. Ensor, on the treatment of kala-azar by the use of senega.

The diagnosis in the case now reported was not confirmed by the finding of Leishman bodies, but the improvement after the administration of senega was so striking that it seems worthy of publication.

Lance-Corporal W., Inniskilling Dragoons, aged 22, service four years (in India two years), was admitted to the station hospital, Mhow, on January 21st, 1910. The temperature was normal and remained so for three days, during which time malignant tertian rings were found in the blood. From the 25th to the 27th the temperature rose, the maximum being 103° F., and it was noticed that the spleen was much enlarged and tender, reaching down to the umbilicus, while the liver was normal. For the whole of February and March and up to April 11th there was fever of an intermittent type; for a few days the rise came every second day, and then subsequently every day. The patient was very anæmic and the pulse persistently fast, never being less than 100, and generally 110 or 120, even when the temperature was normal. The blood examined at intervals was found to contain malignant tertian rings up to March 2nd; on March 8th and 15th and later none were found, and crescents were never seen. Up to March 11th quinine had been given in large doses, both by the mouth and by intramuscular injection; tincture of iodine in doses of

10 to 20 minims had also been given three times a day. On this date Warburg's tincture was tried, and this appeared to have a distinct effect on the temperature, which for three weeks did not rise above 99° F., or 99·6° F., though it never remained normal for twenty-four hours; but the emaciation and anæmia continued, the spleen became larger, the lower edge reaching to three finger breadths below the umbilicus, the liver became also increased in size, and the quick pulse continued. On March 19th, and on two subsequent days, biniodide of mercury ointment was applied to the spleen, but without effect. On April 4th the patient was put on tincture of senega in half-drachm doses three times a day, and in a few days most marked changes began to appear; after a week's time the temperature did not go above normal, the spleen began to diminish in a most extraordinary way, and by April 30th could only just be felt below the costal margin; the weight increased 8 lb. in five days, and then 13 lb. in six days; from being intensely anæmic and emaciated he quite regained a ruddy healthy appearance; the quick pulse began to improve and slowed down to 80 after a fortnight, and to 72 in three weeks.

*Diagnosis.*—The finding of malarial parasites in the blood naturally suggested a diagnosis of malaria, but there is very little doubt that there must have been some disability in addition. Rogers states that no case of uncomplicated malaria will resist quinine for more than six days. This is a point which one of us took considerable trouble to verify last year by examining numerous temperature charts while travelling through a large division, and he is in complete accord with Rogers. In this case quinine was given in large doses at first by the mouth, then both by mouth and injection, and eventually 10 grains were injected three times a day for four days. It did not affect the temperature, and parasites were found in the blood both during and after its administration. It should be remembered that, as a matter of experience, malarial parasites are frequently found in the blood during the course of other diseases. At the beginning of the illness enteric fever was suspected, but blood cultures were negative on two occasions. The man had been inoculated, and the Widal (microscopic) reaction was positive in a dilution of 1 in 80. The same result, moreover, was obtained on a second examination of the serum a few days later. Three relative blood counts were made and in these the large mononuclears were found increased from 11 to 19 per cent., and the polynuclears decreased from 70 to 63 per cent.

The liver was punctured on one occasion; a fine needle was used, and only a small drop of blood obtained; no Leishman bodies were found. Permission to puncture the spleen could not be obtained.

The case seems to us to have been one of kala-azar, but whatever doubts there may be as to the diagnosis, there can be none as to the favourable results which followed the use of senega.

**PITYRIASIS RUBRA ASSOCIATED WITH ULCER OR SLOUGHS  
IN THE CÆCUM.**

BY CAPTAIN R. E. U. NEWMAN.  
*Royal Army Medical Corps.*

THE patient was a European, aged 25. He first came under notice on February 6th, 1910, suffering from a scarlatiniform rash over the chest and a petechial rash above the pubis extending as far up as the umbilicus. He stated that he thought the eruption was due to his having used some native ointment for pediculi pubis.

The rash rapidly spread over his body and was accompanied by "burning" and itching. Twelve days later the skin was cracking and peeling all over the body, and was coming away in flakes, leaving a raw, red, and very tender surface underneath. The scalp, face, eyelids, ears, the trunk, and limbs were all affected, the flakes being especially large on the hands, legs, and feet.

The mucous membrane of the mouth was also slightly affected, and there were fissures and cracks at the angles of the mouth. About the same time his temperature, which hitherto had remained slightly sub-normal, began to rise, and he continued to have an irregular pyrexia until the day before his death, when it again fell to subnormal.

On February 22nd albumen was found in his urine, and on February 26th he began to have slight diarrhoea. He ultimately shed the whole of his epidermis and died on March 1st from pneumonia and exhaustion twenty-five days after the eruption was first noticed.

The chief interest of this case lies in the *post-mortem* appearances, which were as follows:—

*Lungs*.—Right lung: Weight, 31 oz.; congested throughout; the upper lobe was the seat of a purulent pneumonia. Left lung: Weight, 16 oz., lower lobe congested. *Spleen*.—Weight, 7 oz.; congested. *Heart*.—Weight, 10 oz.; no valvular disease. *Liver*.—Weight, 4 lb. 12 oz., somewhat fatty. *Kidneys*.—Each kidney weighed 7 oz., and was enlarged and congested. In both kidneys the capsule was slightly adherent. *Intestines*.—Scattered throughout the cæcum and extending for about 15 inches up the colon were some twenty ulcers or necrosed patches.

These ulcers were about 1 by  $\frac{3}{4}$  inch to  $\frac{1}{2}$  inch in size, and were stained and encrusted with fæces. The long axis of the ulcers was transverse to the long axis of the bowel. Loss of substance did not extend deeper than the submucous coat of the bowel. The surface of the ulcers imparted a grating, fibrous sensation under the knife. The edges of the ulcers were slightly raised, but were not undermined and there was slight congestion round about them. The rest of the lower intestine, and the whole of the upper intestine, were quite normal in appearance.

The significance of these necrosed patches is unknown. Are they usually found in dermatitis exfoliation? Were they primary or secondary

lesions, or entirely unconnected with the skin affection? At the first glance they were taken for healing typhoid ulcers, but the fact that they were practically confined to the cæcum, and that the remainder of the intestine appeared to be healthy, would seem to be against this.

I have not been able to find any mention of a similar condition in any book on the subject that I have had the opportunity of consulting. I am indebted to Major F. Smith, D.S.O., for very considerable assistance with the case.

### GONORRHOÆAL KERATOSIS.

By CAPTAIN H. A. BRANSBURY.

*Royal Army Medical Corps.*

PRIVATE X. was admitted to the Royal Herbert Hospital on January 12th, 1910, suffering from gonorrhœa and a swollen, painful, and tender right elbow joint.

*Previous History.*—Gonorrhœa eight years ago; treated at St. Peter's Hospital, London, for five weeks. Syphilis denied, and no history of its signs or symptoms was obtainable.

*On admission* he was in a debilitated condition, having treated himself in his own home for "rheumatism"; his temperature was 100° F., and his tongue thickly coated. He was put to bed, purged, dieted, given 10 grains of urotropine three times a day, and anterior and posterior irrigations of Condy's fluid for the urethritis; fomentations were applied to his elbow.

Within the next few days other joints became affected, such as the right temporo-maxillary and the left hip, and after he had been in hospital for ten days my attention was drawn to his feet, where I found the following peculiar and rare condition:—

On the dorsal surfaces of the toes of both feet were many little conical "projections," brownish in colour, hard to the touch, and surrounded by a pink halo; on removing them no fluid exuded and their bases— $\frac{1}{4}$  inch wide—were smooth and rose-pink in colour. The lesions on the big toes were not acuminate in character and were irregularly shaped. The soles of both feet were scaly and partly peeled under and about the ball of the big toe, but towards the heel there were several smooth brownish coloured "projections" which were hard, and on removal contained no fluid and left a rose-coloured base. On the inner surfaces of the feet the skin was scaly and there were many hard, brownish papules which could be removed with a little difficulty, leaving the same rose-coloured base.

I carefully watched those areas from which I had removed the little cones and papules, and in a few days the rose-coloured epithelium had become raised, hard and horny, and brownish in colour; but, again, there was no fluid beneath them. The untouched lesions were also

watched and these came away of their own accord, leaving a rose-coloured base which underwent the same changes as I have described above. Syphilis having been excluded a diagnosis of gonorrhœal keratosis was made, and the following ointment applied—viz., Lassar's paste with gr. v. of salicylic acid, which was gradually increased up to gr. xx.; and on March 16th, 1910, his feet were quite normal.

This complication of gonorrhœa is very rare, and as far as I am aware this is the eighteenth case that has been reported. Quite recently a case was shown at the Dermatological Society, and a full description of it was published in the *Proceedings of the Royal Society of Medicine* for April, 1910. A good description is also to be found in the *British Medical Journal* of January 8th, 1910, under the heading "Epitome of Current Medical Literature."

## Report.

### THE GERMAN CAMPAIGN IN SOUTH-WEST AFRICA, 1904-06.

(*Sanitäts-Bericht über die Kaiserliche Schutztruppe für Südwestafrika während des Herero und Hottentottenaufstandes vom 1 Januar, 1904, bis 31 Mai, 1907. Erster Band. Administrativer Teil.*)

By LIEUTENANT-COLONEL C. H. MELVILLE, AND MAJOR C. E. POLLOCK.  
*Royal Army Medical Corps.*

(Continued from p. 240.)

#### (E) IMPROVEMENTS IN RATION.

IN addition to the increase in the amounts of foodstuffs issued already alluded to, further improvements were made in the ration during the course of operations.

In December, 1904, in consequence of the appearance of scurvy amongst the men, an issue of lime juice, cranberries, and preserved vegetables was sanctioned for the field force. This was followed in April, 1905, by a regulation authorising the issue of unusual articles. For instance, a monthly issue was made per man of—

Beer	..	..	..	..	..	6 bottles.
Seltzer or other water	..	..	..	..	6	"
Chocolate	..	..	..	..	2 kilos.	(4·4 lb.)
Cocoa	..	..	..	..	1 kilo	(2·2 lb.)
Lime juice	..	..	..	..	0·15 litre	(5·25 oz.)
Fruit	..	..	..	..	0·15	" (5·25 oz.)
One tin unsweetened milk.						

Such issues could, of course, only be made when transport conditions were favourable. With a view to increasing the variety of the vegetable

*Note.*—On p. 229, vol. xv., last table, tobacco, matches and rum, should be noted as a weekly issue.

ration, it was ordered in December, 1905, that the following extra issues should be made :—

Vermicelli or lentils	..	1 day a month (in alternate months).
Maccaroni	.. .. .	1 day a month.
Preserved vegetables	.. .. .	4 days    „
Dried	.. .. .	2    „    „
Dried potatoes	.. .. .	8    „    „

(It is not made quite clear in the original report whether this was in addition to, or included in, the much varied diet already described.—C. H. M.)

At the end of 1905 it was ordered that 200 cc. (7 ounces) of red wine should replace the daily rum ration. Subsequently, in January, 1906, the following order was issued, applicable in the first place chiefly to the troops in the northern area: “So long as it is impossible to replace the rum ration by one of red wine, the following issues shall be made, until further notice, in lieu of 0·7 litres (24·5 ounces) of rum, cognac, or arrack:—

(a) To troops immediately in communication with railway depôts: weekly, three bottles of beer and three bottles of seltzer water.

(b) To all troops not included under (a): daily,  $\frac{1}{10}$  litre (1·75 oz.) of fruit or lime juice. A corresponding order was made applicable to the troops in the Southern area in March, 1906.

#### (F) INDIVIDUAL FOODSTUFFS.

(1) *Fresh Meat*.—As regards fresh meat, this consisted chiefly of beef. Mutton and goat were less frequently procured, and, in limited districts, game. It was found possible to drive cattle along with the troops, but sheep and goats were unable to keep up with a quickly-moving force. Mutton, in fact, was only available when a halt of some length was made in one place. The South African ox (*Damara-Rind*) is naturally poor in fat; especially bad in this respect were overdriven and badly-fed cattle which were picked up as booty. In addition, out of the looted cattle taken, it was necessary to spare not only the cows, but also to select the youngest and strongest oxen for draught purposes. The cattle procured from Bechuanaland were often suitable only for transport work, the condition of the slaughter cattle having become, owing to long journeys with scanty food and water, very poor. As a result, it was only those oxen which from age or bodily condition were useless for transport that were handed over to the butcher. In consequence, the meat was not only very poor in fat, but also extremely tough, and it was therefore a difficult matter to make it palatable. On this account the issue and increase of the fat ration became an important matter. The beef was fairly often found to contain tapeworms. The mutton was well flavoured and tender; the goats' flesh, on the other hand, was tough and rank. The fat-tailed sheep were much sought after. The fat of a roasted tail, weighing 5 to 7 lb., tasted very much like goose fat, and was frequently used as

a substitute for butter or lard. The game that was shot provided, as a rule, tasty and tender meat, wanting, however, in fat.

(2) *Preserved Meat*.—Occasionally fresh meat was made, after the example of the Boers, into Biltong (*Dauerfleisch*), when there happened to be an excess of meat procurable, and time sufficed. This method, which the peculiar dryness and strong sun of the climate favours, is carried out as follows: Strips about as thick as a man's thumb are cut, preferably from the loins, well rubbed with salt, and dried in the sun. Owing to the evaporation of the water, the meat dries up into a hard mass, which not only keeps for a considerable period, but owing to its small bulk is readily transportable. Biltong can be cooked after it has been roughly grated or soaked in water. That made from game (Springbok, for instance) was particularly palatable and furnished a good meal. This dried meat has the disadvantage that in consequence of the large amount of salt present it is apt to produce thirst, when it is impossible to soak it sufficiently.

As regards the tinned meats procured from manufacturers and imported into the Protectorate, the same may be said as of the medical stores. Those that came from Germany were better than either the English or American supplies. An exception must be made in the case of corned beef. This was, as a rule, more palatable and tender when procured from American than from German sources. The usual complaint made against English preserved foods was that they were too highly spiced. The supplies procured from the Army Preserved Meat Factories were specially good, and unsurpassed by those of any private firm; admirable samples of preserved meats were, however, procured from many German manufacturers. It was found impracticable to have tins containing more than one to three rations. Under South African campaigning conditions, as, for instance, on patrol, tins of larger size were cumbersome to carry on the saddle, and in consequence the food was consumed too rapidly or else thrown away; while if a tin which had once been opened was carried for any distance the contents rapidly went bad. In consequence a rule was made at the end of 1904 that the meat and vegetable portions of the iron ration should be packed as regards 75 per cent. in single, and the remainder in triple ration tins.

Turning now to particular kinds of preserved meat, corned beef and boiled beef were very little appreciated. This resulted from the fact that in the first year of the war these two forms of preserved meat were almost exclusively issued, and in consequence a distaste was formed for them. In addition they lost much of their value, more particularly in the case of the corned beef, on account of the large amount of fascia, &c., that was present. Corned beef, which in a cold climate is excellent even when eaten cold, acquires a very unappetising appearance in a hot climate, owing to the melting of the fat. Later in the war boiled beef was

never, corned beef only rarely, issued. Strongly pickled meats were objected to on account of their thirst-producing qualities.

Preserved vegetables did not stand transport as well as preserved meats. The same was the case with preserved sausages, more especially blood and liver sausages. When packed in single ration tins they were liked, and were, as a rule, good; in larger tins they usually went bad, even when packed in formalin gelatine. Brunswick sausages in 1 kilogramme (2·2 lb.) tins were so highly spiced as to be uneatable alone. Better and more appreciated were ham sausages (*Dauerwurst*), also bacon ham, and smoked meat. The latter, however, were rarely sent to the front, owing to the risk of their going bad in the heat.

Among the English supplies, preserved fish and sardines in oil were frequently issued instead of fresh meat. The former were mostly packed in vinegar, and therefore unsuited for use in large quantities; in addition they were frequently bad. On the other hand, the latter, owing to their being packed in extremely handy little tins, did good service in the provisioning of patrols, and were much sought after on account of the oil in which they were preserved. As a complete substitute for the meat ration they are not otherwise of much value. All fish packed in vinegar stood carriage badly; the constant shaking breaks up the soft fish meat into fragments.

(3) *Mixed Preserved Foods*.—These were packed up in one or three portion tins, and were generally liked, but contained too little meat. In many the vegetables also were scanty, so that the bulk of the contents was fluid. When a man, instead of his 233 grammes of preserved meat and 220 grammes of preserved vegetables (the allowance on the restricted scale), received a tin reputed to contain 400 grammes of mixed preserves, and found that these consisted of 100 grammes of meat, with a few particles of vegetables floating in 300 grammes of fluid, it is clear that the nutritive value of his ration fell considerably below the average. The scanty allowance of meat was particularly noticeable in the English preserved foods (Army rations.) Pork in pea soup was found unsatisfactory, since the large proportion of fat present made it unappetising in hot weather.

Experiments were made with tins containing a heating arrangement (spirit or calorit.) The contents were extremely good, and, in the absence of fuel, these foods might be of good service. They possess, however, the disadvantage that only one-third of the weight of a tin represents food. In the tins containing methylated spirit the amount of fuel supplied was insufficient, while at the same time it evaporated too quickly.

(4) *Flour and Bread*.—The flour, which for greater convenience consisted of equal parts of rye and wheat flour, was in general of good quality. It was found better to pack it in tins than in bags, to keep it dry. The flour which was imported from Cape Colony, the so-called Boer flour (*Burenmehl*) was only issued to the troops under stress of circumstances

and was almost entirely reserved for the natives. It readily acquired an unpleasant smell.

The bread supplied to the troops in the various stations was baked either in portable field ovens or in built ovens. To some extent Peyer's portable ovens sent out from home were used.

In the Herero War the larger detachments were accompanied by field bakery columns, consisting of one portable field oven, one store wagon, and one flour cart, which were a success when it was possible to use them. Unfortunately there were great difficulties in the way of getting them along in the field. Occasionally complaints were made that the bread baked in the field bakeries was burnt outside and dough inside, so that the units requisitioned for flour to bake bread themselves. In the Hottentot War only one field bakery column was mobilised, and this remained at Kub. It supplied the detachment at that place, and all parties passing through. As a rule units baked their own bread.

Bread or flour are the two foodstuffs the lack of which is felt most by men on service. This was more particularly the case on this occasion, since it was impossible to make up the deficiency of starchy foods by means of potatoes.

As a substitute for bread, egg biscuits were much liked, and were eaten after soaking in tea or coffee; on the other hand, hard bread and wheaten biscuits were not cared for. Egg biscuits kept better than these, but often contained weevils. Hard bread was frequently rotten, mouldy, and full of weevils, and of such a stony consistence that it could with difficulty be broken up even with the bayonet; it was, in consequence, rarely issued.

(5) *Vegetables*.—As already stated, owing to the difficulty of transport, it was impossible to issue fresh vegetables except to troops at the ports of entry on the coast or in the immediate vicinity of the railway. At the same time, in view of the danger of scurvy, the necessity of such a supply to troops in the field was obviously a matter of the greatest importance. Fresh potatoes also could only be supplied in the vicinity of the rail. Those shipped in November and March from Germany were better than the supplies from the Cape. In spite of being packed in metal cases, about half the fresh potatoes were lost by decay. Onions were much appreciated as an adjunct to the inferior meat that was received by the troops, and also stood carriage better than any other vegetable. During the Herero War they were issued dry, but later, as far as possible, in the fresh state.

Indigenous vegetables play a great part in the dietary of the natives, and were occasionally made use of. The "*tschamas*," or wild water melon, prepared as a salad, or the small onion-shaped tuber of the *Cyperus esculentus* (Linn.), the native name for which is "*ointjes*," when roasted, were occasionally made use of. They could not, however, be depended on to any great extent in the rationing of the force.

Of the dry vegetables rice was the most appreciated, and was always eaten with relish. It was often issued for weeks at a time, and in spite of this, and its comparatively small energy value, it was never tired of. The great advantage of rice is that it leaves behind it a sense of repletion, and even prolonged use does not breed a distaste. It can be rapidly prepared with field cookery to go with any other form of food. For patrols it was indispensable, and took with them the place of bread.

Groats of various kinds, oatmeal, and sago were not much cared for. They did not keep well, and the last named was difficult to prepare. Vermicelli and macaroni were welcomed so long as they were not issued too often; the latter frequently contained maggots. Preserved vegetables, *Erbswurst*, &c., had the advantage that they were readily prepared; on the other hand, they were apt to produce thirst, and were rather soon tired of.

The leguminous vegetables (*Hülsenfrüchte*) were difficult to cook, unless they were soaked for twenty-four hours beforehand. Even then prolonged boiling was necessary, which entailed a considerable waste of fuel. They were, in consequence, unsuitable for movable columns.

In the same way dried vegetables were objected to as demanding prolonged soaking. Parsnips, celery, leeks, parsley, and other pot herbs (*buntes Huhn*), were useless in this form, on account of their insipid taste.

Dried potatoes made an excellent substitute for the fresh article, and lent themselves readily to preparation as "chips." They were, however, rarely procurable by the troops in the field.

As regards mixed vegetables, "*sauer kraut*" was highly appreciated. Packed in kegs it kept badly, but remained good in tins. The English tinned vegetables were highly spoken of.

(6) *Fresh and Preserved Fruits*.—The same remarks apply to fresh fruits as have already been made with reference to fresh vegetables. All kinds of preserved fruits, such as dried fruit, fruit syrups, jams, mixed fruits of all sorts, were much relished. In spite of the fact that they added considerably to the weight carried, it was thought desirable to issue them as often as possible, to satisfy the desire for fresh vegetables, which were so much missed and so hard to obtain. Dried prunes eaten raw alleviated thirst. Jams made an excellent substitute for butter, in hot weather more especially, and assisted to make the bread more palatable. In the case of preserved fruits, it was found that packing in large tins (up to 5 kilogrammes—nearly 11 lb.) was a mistake.

(7) *Butter and Lard*.—A special "fat" issue was of the greatest importance, since except when fat-tailed sheep were killed the troops were not in a position to provide themselves with this article. This was the more necessary, since the ordinary slaughter cattle were poor in fat, and this ingredient was needed for tasty cooking. On these grounds, and also because the high nutritive value of this principle was recognised,

the ration of fat, which had already been raised to 60 grammes, was further increased to 80 grammes. A decided drawback was the packing of butter and lard in large (1 to 2 kilogrammes—2 to 4 lb.) tins. Small patrols were, therefore, forced to go without the fat ration, and larger detachments, owing to the impossibility of carrying opened tins, had to consume their ration in advance. Tinned butter was occasionally found to be rancid, and was less useful than lard in hot weather, since it melted in the heat and acquired an unpleasant appearance, unless special cooling arrangements were feasible. The lard was, as a rule, good, with the exception of the American hog lard ("Snow drift") imported from the Cape. The greater part of this was rancid and unfit for consumption. Examination of the American lard revealed the presence of a considerable proportion of cocoa-butter.

(8) *Sugar*.—As in the case of fat, the demand for sugar was so great that even the increased ration of 40 grammes was found insufficient. The chief demand for this article was as an adjunct to tea, coffee, and cocoa. Cocoa especially, when unsweetened, was only occasionally of use. The craving for sugar, which frequently manifested itself throughout the campaign, was not entirely on this account, however. Its peculiar digestibility, and the fact that it is completely absorbed, and can be eaten without any preparation, make it a most excellent food in cases of fatigue, hunger, or malnutrition, conditions that are so frequent on service. In addition, sugar, as long as it is protected from damp, keeps indefinitely, and can be carried by the individual soldier in his haversack. (The Japanese in Manchuria relied greatly on a liberal issue of sugar as a protection against severe cold. It was served out raw, and carried by the men in their pockets.—C. H. M.)

(9) *Tea and Coffee*.—Coffee was much preferred to tea, since it possessed to a considerably greater extent the property of disguising the taste and appearance of bad water. In addition, tea was much more apt to lose its flavour, if badly packed, than coffee. Tea had also the disadvantage that it was difficult to get rid of the leaves, even if it were allowed to stand for some time, and if this were done it became too astringent, which was not the case with the coffee. Not infrequently there was a tendency amongst the men to make the coffee too strong, and it was considered that this led to cardiac trouble. Since 15 grammes ( $\frac{1}{2}$  ounce) of roasted coffee gives 0.26 gramme of caffeine, the two-thirds ration of 53 grammes unroasted (= 45 grammes roasted) coffee contained 0.78 gramme caffeine, or one-half the daily maximal dose of 1.5 grammes. At the same time it must be mentioned that unground and, to a great extent even unroasted coffee was issued to an inconvenient extent,\* and the beans were perforce powdered mostly by means of the gun-butt. Under these circumstances it may be imagined that the resulting decoction did not contain nearly so much of the alkaloid as above stated. Nevertheless, the continual daily use of even this smaller dose of caffeine may quite possibly affect the

*The German Campaign in South-West Africa*

heart.

~~coffee~~ The tea ration contained approximately the same amount of ~~of~~ as the coffee ration. (The above remark as to the powdering ~~of~~ coffee is interesting. The French have a very handy coffee-mill, of which one is carried for every thirty men. If coffee is issued it seems a mistake to carry it under circumstances that preclude its proper use. It seems unnecessary to carry an amount which cannot be completely made use of. Better carry a smaller ration and a coffee-mill. Our own ration of tea is one-half, and the coffee one-third of the German ration. It would be interesting to know if the Colonial contingents, notoriously great tea-drinkers, suffered more from cardiac trouble than our own men in South Africa.—C. H. M.)

Frequently roasting machines were supplied to units. It is worth noting that coffee should be issued to patrols ready ground, and in the case of the iron ration in the form, preferably, of tablets, so-called compressed coffee.

(10) *Cocoa*.—This was not much liked by the men, since it does not possess the stimulating effect of tea or coffee. It does not assuage the thirst like these latter, and cannot be carried in the water-bottle. The greatest objection to it, however, was that it could not be drunk unsweetened, and the sugar ration was insufficient to disguise the bitter taste. It was useful when it was necessary to make brackish water drinkable.

(11) *Chocolate*.—Chocolate, which like cocoa was frequently given as a free issue (*freiwillige Gabe*), was not of much use on the march (although it was eagerly eaten), because of its tendency to produce thirst, and also because in hot weather it was apt to melt in the haversack.

(12) *Milk*.—Condensed sweetened, and to a certain extent also unsweetened, milk was only occasionally issued to the troops at the front. It was much relished as an adjunct to tea, coffee, or cocoa. For use two small holes were made in the lid by means of a punch. These were covered over with paper or closed by wooden plugs.

(13) *Spices*.—The spice ration of 5 grammes of pepper, cloves, or bay leaves, was too large. Half the amount would have been sufficient. On the other hand, there was a distinct demand for other foodstuffs such as cheese, mustard, curry powder, powdered herbs, and meat extract. These would have helped to render the monotonous diet more palatable. The most useful were mustard, anchovy paste, and meat extract in tubes.

(14) *Alcohol*.—The issue of alcoholic liquors constituted an interesting question throughout the campaign. In considering whether such an issue is advisable or necessary we may approach the subject either from the psychological or the hygienic aspect. In the first place a complete deprivation of alcohol is unnecessary, while the loss of an article of diet to which the men are so accustomed and which they appreciate so much might be followed by unpleasant consequences. Taking the psychological point of view there is no doubt that alcohol has

a beneficial effect on the temperament, and enables a man to face the various inconveniences of field service, monotony, privation, fatigue, discomfort, and other depressing influences, besides putting heart into him, an effect that was frequently shown in South-West Africa. Finally, it is impossible to deny that a complete deprivation of alcohol tends to lead the men into taking every opportunity of obtaining it from the retail dealers, in a form that would undoubtedly be costly and might often be noxious. The rational function of alcohol as a means of warding off the possibly harmful effects of climate and other baneful surroundings lies in its heat-producing powers. The quality that alcohol possesses of producing a feeling of warmth, although this consists largely in a dilatation of the cutaneous vessels, and may be followed by a reactionary increased heat-loss, was invaluable in helping the troops to face unsheltered the bitter cold of the nights during the dry season. (This reactionary cooling effect is always made great use of as an objection to the issue of alcohol. Knowing as we do the great effect that clothing has in preventing the escape of heat on the march, it is obvious that it must have a similar effect on a man whose body temperature is raised by alcohol. A man well buttoned up in a great coat does not suffer much direct loss of heat by radiation from dilated cutaneous vessels, whether the cause of the dilatation be exercise or alcohol. The argument usually put forward in this connection presupposes a state of nudity.—C. H. M.) Here, too, the sleep-producing effect of alcohol was of benefit, since other drinks like tea and coffee, though they may produce an equal amount of warmth, when drunk hot, rather tend to prevent sleep. The warming effect of alcohol was especially of value under conditions when owing to the proximity of the enemy it was impossible to light fires.

It was in addition advisable to provide the men with some means of disguising the taste of bad water, when tea or coffee were not available. The peculiar qualities of alcohol were seen to the best advantage in the Herero War, about the middle of 1904. The troops were exposed to all the discomforts of a prolonged bivouac with insufficient shelter, in extreme cold weather, with scanty food and hard work. Their power of resisting disease was much lowered and dysentery and typhoid fever were prevalent and increasing. An increase in the issue of alcohol was most beneficial. In this connection it must not be forgotten that alcohol in a certain sense is a true food, and as such has under conditions of scanty nourishment a definite place to fill. It has a right to be considered as a foodstuff on account of the rapidity with which it can be oxidised, and it can thus act as a "sparer" of fats and carbohydrates. A certain proportion of the alcohol consumed escapes by the breath and urine unoxidised (the proportion unutilised varies with different observers—Bins says 3 per cent., Strassmann, 10 per cent.). If we take the ordinary ration of rum 100 cc. and allow 6 per cent. for waste we shall get about 42 grammes of alcohol, the combustion of which will produce about 300 Calories,

1 gramme of alcohol producing 7 Calories, and save in this way the combustion of 33 grammes fat, or 81 grammes carbohydrate. Even these small amounts may become of importance when rations are being cut rather fine.

The value of alcohol as a condiment must also not be overlooked. It was of great use in this direction in view of the monotony of the field diet, and the prevalence of dyspepsia. It also came in useful as a substitute for leaven, yeast, or baking powder, and in the cooking of fresh meat.

It must not be forgotten that the good effects of alcohol depend very largely on the degree of concentration. Unfortunately for long periods the ration had to be issued in a concentrated form, rum, arrack, or cognac, on account of their greater portability. To get the best effects out of alcohol and to avoid its dangers it is necessary to choose carefully the time of issue. This should never be during the heat of the day, or before severe exertions. Large quantities also should not be issued at a time. The experiences of the campaign have now taught us that in spite of the advantages that alcohol possesses, some of which are undoubted, though others are not universally accepted as proved, it also has serious disadvantages, which must be taken into consideration. So great are these that it is a serious question whether alcohol is not only not indispensable, but even whether it is beneficial under conditions such as obtained in South-West Africa. The chief difficulty lay in avoiding the misuse of alcohol the result of want of self-control, and the consequent production of poisonous effects. For this reason the opinions held on this subject altered considerably during the course of the war.

In the first place the ration of spirits (100 cc. =  $3\frac{1}{2}$  ounces of rum, cognac or arrack) was too high. In addition to the good effects produced, which have already been mentioned, others resulted which were by no means satisfactory, especially on field service. These showed themselves partly in an uncontrollable drowsiness, partly in a tendency to quarrel, and contradict, slackness or refusal to obey orders, occasionally also by violence, more especially when the quality of the liquor was at all in doubt. One fact came out very clearly, and that was, that in addition to those men who possess an inherited or acquired intolerance of alcohol, the conditions of service in South Africa, over-exertion, under-feeding, loss of sleep, hunger and thirst, intestinal and stomachic disorders, and exposure to the sun, all worked together to produce in otherwise healthy men a distinct susceptibility and want of power of resistance to alcohol. The original order by which a weekly issue of 700 cc. ( $22\frac{1}{2}$  ounces) was made exaggerated the evils of the ration. The possession of such a large amount of spirit led to a considerable number of cases of aggravated drunkenness and violence. The results as regards discipline and efficiency were very bad. Although the mistake involved in the weekly issue was quickly recognised, and the daily ration as far as possible made

the rule, still many conditions, such as the splitting of detachments into smaller parties, and the consequent loss of uniformity of custom, and want of supervision, threw difficulties in the way. Even with the daily issue there were many disadvantages. Individual men purchased the rations of others and thus got the opportunity for transgression. The observation was frequently made that men who previously never touched alcohol, or only to a moderate extent, acquired the drink habit as a result of the daily issue. Whereas the issue of a spirit ration, daily, was still considered a necessity in the cold weather, the opinion gained ground during the campaign that in the hot weather, red wine or some non-alcoholic beverage would be more suitable. The improved health of the men also led to a consideration of the advisability of abandoning or altering the spirit ration. In consequence an issue of 200 cc. of red wine, or 50 cc. of fruit or lime juice, was sanctioned in lieu of the daily rum ration. The difficulty of transport rendered these rules useless except as regards troops near the railway. In the southern area it was possible to procure Cape wines, usually red wines, from English territory. From the beginning of 1906 fruit juice was available everywhere.

Rum, Arrack, and Cognac.—Of the different forms of spirit, rum was preferred, though frequent complaints were made by the troops of its inferior quality. This was more especially the case with a particular brand, issued mostly in 1904, called "*Niggertod*." It had a bad taste and smell, contained a large amount of fusel oil, and was unwholesome. The "Cape Top" (*sic*—? *Dop*) imported from English territory was also of poor quality. Rum was consumed either raw, or with water, tea, or coffee, or in the form of punch. It was also utilised in baking bread and cooking meat. Arrack was less favoured than rum, and cognac less still.

Cape Wine, Port Wine, Sherry, &c.—None of these played an important part in the provisioning of the force.

Red Wine.—This was as a rule of good quality, and was much liked as a beverage in cases of digestive trouble. In cold weather it was much appreciated when mulled.

Beer.—This was almost entirely bottled beer, of many kinds, and of unequal quality. The experiment of importing beer in barrels from the Cape failed, as it rapidly went bad. Beer was drunk chiefly by troops on the lines of communication and preferred by them to all other beverages. It was much appreciated on the few occasions when it was issued to troops in the field.

(15) *Fruit Juice*.—The German jams were better than the English, but not always free from adulteration.

*Tobacco*.—Tobacco was much sought after. It was valued chiefly for its power of allaying hunger and thirst. For many men it formed an absolutely indispensable issue, which they felt the loss of more than the loss of food or drink. In the absence of tobacco, tea-leaves, coffee grounds, or grass, were used as substitutes. The tobacco was chiefly in

the form of sticks, which on account of their convenient shape, and the fact that they were unaffected by heat or drought, were extremely useful under campaigning conditions and highly appreciated. These sticks came mostly from English firms, and were highly flavoured with aromatic substances. The tobacco was very strong and continued use led to digestive and cardiac trouble. Many attempts were made with a view to correcting its unwholesome qualities, by means of boiling and subsequent drying. More than once the opinion was advanced that these sticks contained, in addition to their high percentage of nicotine, other narcotic substances. A chemical research made on this point in the Hygiene Laboratory of the 9th Army Corps, in which several samples of stick tobacco from different German firms were examined, revealed the fact that no other leaves but those of tobacco were present. The nicotine content of the darker sticks varied from 2.62 to 3.25 per cent., that of the lighter ones from 2.14 to 2.64 per cent. In neither the lighter nor the darker was any trace of other alkaloids (morphia, narkotin, codeia, &c.), or of caffein, metals, or salicylic acid found.

The researches of Lehmann show that nicotine is the most important and practically the only poisonous body that need be considered in the case of tobacco. When a pipe is smoked practically all the smoke goes into the smoker's mouth, and the poisonous effects observed after prolonged use of stick tobacco must be connected with the high nicotine content proved to exist by chemical examination.

A better class of cut tobacco was often asked for.

Cigars were plentiful and much liked. They were available in a limited area only, since unless packed in tins, or cigar cases, they are readily dried up and broken to dust.

*Cooking and Preparation of Food in the Field.*—At fixed posts slaughter-houses, bakeries and kitchens were established under proper supervision. In the field numerous difficulties were met with.

Most of the new arrivals only possessed the very slight knowledge of cooking which they had picked up during peace training. On taking the field they were obliged to do their own cooking under circumstances of great difficulty. The raw material supplied was of different quality to that which they had been accustomed to, cooking utensils were few, water and fuel were scarce, and everyone had to learn afresh how to cook his own food; the majority succeeded in doing so.

The men preferred to form "cooking groups" of from 2 to 4 in each; by dividing the work incidental to cooking, better and quicker results were obtained.

The German cavalry mess-tin "a/A" was mostly employed, and found to be more satisfactory than the English pattern. It was used for carrying the uncooked ration and was suitable for boiling, roasting, baking, and especially for baking bread. Very little fuel was required, as it could be placed on two stones over a small fire.

Cooking in camp kettles was not always possible, as these had to be carried on the baggage wagons and were frequently not available when meals had to be prepared. They also required a large fire, for which the fuel was not always obtainable, and moreover meals could be prepared in a shorter time by using the mess-tins.

*Mincing Machines.*—In the field mincing machines proved of the greatest value in preparing food. The pattern which was most generally supplied weighed 25 lb.; its full working capacity was 132 lb. per hour. Its great advantage was that freshly killed meat which was stringy and tough could with little labour and no waiting be made palatable and easily digested even by men with bad teeth; also it enabled the men to prepare fresh blood, liver, or meat sausages, to crush lentils and peas, and so obviate the necessity of prolonged soaking before cooking. Meat when minced could be more easily cooked than when merely cut up, a great advantage when fuel was scarce.

There were several objections to the use of mincing machines; thus a company of 100 men equipped with two machines in good working condition, required twenty-five minutes to mince their ration of 110 lb. of meat, in addition to the time required for cutting up the meat, while owing to the weight of the machines the number could not be increased; as they had to be carried on ox wagons they were frequently not to hand just when required. The machines often became damaged and could not be repaired; owing to the toughness of the meat the knives soon became blunt, which in turn reduced the rate of output.

In the field the meat ration was usually obtained from freshly slaughtered cattle. These were in poor condition and often overdriven. At the higher altitudes the temperature at which water boiled was lowered by as much as 18° F., which also interfered with the proper cooking of the meat. To improve its flavour and tenderness rum was added, or in some cases bicarbonate of soda. Sometimes the meat was first boiled to furnish soup, and then roasted to make it more tender. Another plan successfully employed to make the meat tender was to bring the contents of a mess tin to the boil, and then put on the lid and cover the whole with glowing ashes and earth, thus making an improvised "steamer," in which the toughest meat became tender and palatable in one and a half hours. When time permitted a somewhat similar plan was adopted; the mess tin was filled with cut-up meat and spices, the lid put on, and the whole covered over with glowing ashes and earth for four hours; this method was specially employed at night, the contents being eaten next day.

When halts were very short the meat was cooked by toasting it over the fire on the end of two cleaning rods joined together, or of a long stick; the resulting steak was juicy but very tough and somewhat difficult to masticate. "Hottentot-beef" was prepared by cutting the meat into steaks and laying it in the glowing ashes for ten to thirty minutes; although very unappetizing in appearance, and having a strong burnt

flavour, it was nevertheless a popular form of cooking it. In many cases the meat was eaten raw, and not uncommonly this practice was followed by the appearance of tapeworms.

*Baking of Bread.*—The troops on columns mostly had to bake their own bread, and to learn how to do this by experience. The preparation of the dough or "sponge" gave rise to the greatest difficulty, as dried yeast or baking powder was frequently unobtainable. When time permitted a sour dough was first prepared by making a paste with a little sugar, stale bread, flour and water, or even plain flour and water, and standing this in the sun for two to three hours; this sour dough was then worked up with the rest of the flour, kneaded on the canvas of a tent, and placed in the sun or near the fire to rise. In order to save time on other occasions, the men tried to save a portion of the sour dough.

When pressed for time a little rum or vinegar was used in place of the sour dough, but the resulting bread was heavy.

A mixture of rye and wheaten flour was preferred to pure rye flour, as it made a lighter bread.

The "sponge" was baked in mess-tins, baking-pans, or the lid of a mess-tin, the inner surface being first smeared with fat. The baking was done by placing the lid of the mess-tin on the glowing embers for twenty minutes, or by placing the covered mess-tin containing the dough in a hollow surrounded by glowing embers and hot ashes for one and a half to two hours. When the force remained stationary for any time, field ovens were built of mud bricks, or the interior of an ant-heap was adapted for the purpose.

The addition of crushed ration egg biscuit improved the flavour of the bread. The troops became so expert in baking that they preferred bread baked by themselves to that prepared in the field bakeries.

*Water.*—Throughout the colony water was scarce, partly on account of the great depth of the subsoil water and absence of permanent streams, and partly because the rainfall took the form of sudden heavy down-pours. The usual source of supply was from deep wells, many of these 60 to 90 ft. in depth, with a variable and uncertain yield; in other cases water was obtained from pools or "vleys," frequently, however, they were brackish and unfit for drinking. All the well-known sources of water were highly contaminated by natives and animals, and not uncommonly the corpses of drowned animals had to be picked out of the water.

*Purification of Water.*—The troops were liberally supplied with Berkefeld filters, but they were not found to be satisfactory. The muddy water speedily choked the candles, and with the rough usage in the field fractures were constantly occurring, consequently no reliance was placed on the quality of the filtered water, and it was boiled before use.

*Portable Water Sterilisers.*—The Rietschel-Henneberg apparatus, designed to sterilise water on the "heat exchange" principle after preliminary filtration was tried in two forms, one for pack transport and the

other on wheels. Both patterns were found to be too heavy for the transport available with the field force; they were also complicated and liable to get out of order, and required two specially trained men to supervise them. The wheeled pattern was successfully employed on stationary posts. Kade's apparatus was even less satisfactory.

*Use of Alum.*—The most satisfactory plan was found to be boiling, followed by precipitation with alum when time permitted this to be carried out. Boiling alone was carried out when practicable; want of fuel and time for cooling sometimes prevented this being done, in which case the men made tea or coffee.

During some of the expeditions water transport columns accompanied the troops, water being carried in barrels, zinc-lined boxes, or any available receptacle. On one occasion, in order to cross a stretch of 125 miles of waterless country, a camel corps was organised for water carriage.

Conservancy arrangements were frequently difficult to carry out owing to the rocky nature of the ground and the scarcity of labour, while the lack of fuel at most of the posts prevented the use of incineration. Various disinfectants, but principally quicklime, were freely used to render the shallow trenches as harmless as possible, and to prevent flies from breeding in them.

*General Sanitary Precautions.*—On the way out instruction was given to the men on all points concerning the maintenance of their health. At fixed posts a sanitary commission was formed to supervise the sanitation of the station.

(4) *Work of Individual Medical Units.*—As the campaign progressed, stationary hospitals, native hospitals, and non-dieted hospitals, were gradually organized on the lines of communication, while bacteriological and chemical laboratories were provided at each base.

(5) *Transport of Sick and Wounded by Land.*—The usual difficulties of conveying patients in a sparsely inhabited country were experienced in full measure. Wheeled transport frequently could not be taken owing to absence of roads, and helpless patients had to be carried by hand for hours over sandy deserts. An interesting description is given of passing a sick convoy by hand across the Orange River, the men having to work for eight hours on end, standing up to their waists in the stream.

(6) *Transport Home by Sea.*—Elaborate precautions were taken to prevent the introduction of disease into Germany. All men who had suffered from typhoid or dysentery were bacteriologically examined before embarking. A total of 1,944 convalescents from typhoid fever were bacteriologically examined, 57 ( $= 2.93$  per cent.) were found to be carriers. These were treated with calomel and urotropine; the latter drug was found efficacious in banishing the bacilli from the urine.

Among 476 convalescents from dysentery only 3 ( $= 0.72$  per cent.) carriers were found.

Known carriers were sent home under special precautions to prevent the spread of disease on board ship or after arrival at home.

(7) *Voluntary Aid Societies*.—The Red Cross Society furnished 92 hospital attendants, while the Frauen-verein für Krankenpflege in den Kolonien sent 31 war reserve sisters. Some of these, in addition to nursing, undertook letter writing for the sick, others superintended the cooking and washing in hospitals, and thus added very materially to the comfort of the sick. The Red Cross Society, in addition to collecting and forwarding gifts for the sick and troops generally, spent some £40,000 in small comforts.

Of the appendices, 2 (A) gives a very full set of hygienic rules as to living on board the troopship, and after arrival in the Colony.

2 (b) is an advice leaflet on typhoid fever.

6 (a) gives the standing orders for the army medical services during the expedition.

6 (b) contains a list of questions on medical and surgical experience, which every medical officer had to fill up before leaving the colony.

Appendices 7 to 18 deal with contents of medical and surgical chests and equipment.

19 details the clothing and equipment of a mounted man of the colonial force.

20 gives a tabular list of water analyses.

22 contains instructions for the guidance of medical officers examining men on their return from South Africa.

This portion of the report is very complete, and contains a mass of information. The experiences of the German expeditionary force were on the whole similar to those which our forces have met with in various colonial wars. No report of any British expedition deals so minutely with the medical problems to be solved under similar conditions. As a work of reference this report will be invaluable for many years to come.

#### APPENDIX 2A.

#### RULES FOR THE PRESERVATION OF HEALTH DURING CAMPAIGNS OUTSIDE EUROPE.

##### (A) *On Board Ship.*

(1) Want of cleanliness either of the person or clothing may, owing to the necessarily restricted space on board ship, be a cause of sickness.

(2) Daily washing of the whole body with soap should be carried out, followed by careful drying. Washing must only be done in the appointed lavatories.

(3) Special attention should be paid to the cleanliness of the mouth and the teeth should be brushed after each meal, and before going to sleep each night.

- (4) Spitting on deck or other dirty habit is strictly forbidden.
- (5) After washing the decks they must be carefully dried.
- (6) Troops must only use the proper latrines assigned to them, and be careful not to make any unnecessary mess.
- (7) The ventilators must be opened and closed strictly in accordance with the instructions issued.
- (8) The feet must be attended to just as much on board ship as on land. Any tendency to excessive perspiration of the feet must be reported to the medical officer for treatment.
- (9) Clothing must be worn to suit the prevailing temperature; underclothing should always be worn in very warm latitudes; during hot weather it is wiser to reduce clothing by leaving off outer clothing rather than underclothing. Sleeping on deck may be permitted in special circumstances, troops doing so must bring up their mattresses and wear underclothing as well as a kummerbund. Blankets must be taken on deck and kept handy, but need not be used unless the man wishes. The railings will be protected by canvas to prevent any sleeper from falling overboard; special sentries must also be posted.
- (10) Owing to the cramped conditions of life on board ship men will be regularly exercised by means of games, or drills.
- (11) Any illness of any kind must be reported to the medical officer at once. By concealing disease on board ship, comrades are much more liable to be infected than on land. This applies especially to bowel complaints and venereal diseases.
- (12) When in any harbour the troops are not to have any communication with the native population, and especially not to use any of their eating or drinking utensils. Over-ripe fruit must not be eaten. In countries abroad there is considerable danger from mad dogs; any man sent ashore will, therefore, not go near or pet any dog.
- (13) The drinking of strong spirits weakens the body and makes it more liable to infection and must, therefore, not be indulged in. Any alcoholic drink must be taken in small quantities only. Coffee or tea is much preferable as a drink. Lemonade is advised.
- (14) Most men not accustomed to sea-travelling must expect to be sea-sick. In this case they should remain in the fresh air on the upper deck, and as near the middle of the ship as possible; they should not look at the deck or at any moving part of the ship, but instead fix their gaze on the horizon. Small quantities of easily digested and stimulating food should be taken frequently.

*(B) On Arrival in Foreign Countries.*

The different conditions prevailing abroad make the soldier much more liable to illness; he must, therefore, pay special attention to the following points in order to retain his health.

*(a) Climate.*

(1) Great heat accompanied by moisture has a very relaxing effect on the body. During the heat of the day one should, if possible, rest.

(2) If obliged to undertake severe bodily exertion in a hot, moist climate, heatstroke may result. The symptoms are as follows: Excessive perspiration, the skin then becomes dry, the face red, respiration and pulse become hurried, the temperature rises, there is singing in the ears, the man begins to feel dizzy and finally falls. These cases must be reported to the medical officer immediately; in the meantime, the following points should be attended to: The clothing should be opened up, the man placed in the shade with his head slightly raised, the body should be sprinkled with water and fanned. Should breathing cease, artificial respiration should be begun. Should the man fall asleep, he must be carefully watched, paying special attention to the breathing. By attention to diet, and avoidance of all excesses, the liability to heatstroke is considerably diminished.

(3) If the uncovered head is exposed to the sun, sunstroke will probably ensue; the sun's rays falling on the bare skin will cause a mild burn.

(4) The sharp changes of temperature following sunset are very liable to cause a chill; hence it is important to wear a kummerbund, at least, during the night.

*(b) Food and Clothing.*

(1) A properly regulated diet is imperative if health is to be maintained. Even during sultry weather, when the appetite is poor, it is highly important that men should not neglect to take a fair amount of food, but fatty articles should be avoided.

(2) In hot countries every kind of excess is to be avoided, and especially strong alcoholic drinks, as these render a man more susceptible to disease.

(3) A suitable selection of articles of diet will be arranged by those in superior authority.

(4) The quality of articles of diet must be carefully watched. Meat or fish which has to be kept must be stored in a place with free access of air.

(5) Articles of food must be properly cooked; this applies to milk, fruit and vegetables. Fish or meat which has become tainted is not to be made use of.

(6) Food left over at any meal is to be thrown away.

(7) Particular attention must be paid to the quality of the water for cooking, drinking and washing. Should this be of doubtful quality it must first be boiled or filtered; the addition of spirits is no safeguard. Muddy water may be clarified by the addition of alum (a handful to sixty gallons) and allowing it to stand. It must be boiled before use. As

boiled water loses its flavour it is preferable to prepare tea or coffee with it.

(8) Men are advised to drink slowly and only in small quantities at a time.

(9) Clothing should be regulated to suit the prevailing temperature.

(10) Underclothing should always be worn during hot weather, the jacket may be left off, but the underclothing should be retained.

(11) Clothing which has become damp by perspiration or otherwise should be changed at the earliest opportunity ; in doing so men must be careful not to stand in a draught.

(12) The damp clothing should be hung up to dry ; after drying it should be thoroughly shaken or beaten.

*(c) Care of the Body.*

(1) Physical fitness may be much improved by careful attention to cleanliness of the body.

(2) Cold douches improve the tone of the skin, but must not be indulged in when a man is hot and sweating.

(3) Bathing may only be carried out at appointed places.

(4) The hands are to be washed with soap, more especially after going to the latrine and before eating.

(5) The care of the feet is most important in a hot climate ; excessive perspiration requires medical treatment.

(6) Cleanliness of camping grounds is just as important as cleanliness of the body ; excrement, urine and filth of all sorts must be removed to the appointed place for destruction.

*(d) The more important Diseases.*

(1) The following are the most important infectious diseases : Dysentery, typhoid, cholera, yellow fever, plague, malaria, syphilis and gonorrhœa.

(2) These diseases may be acquired in several ways, by direct contact with a sick person, by water and food or by insects, and some of them may easily become epidemic ; it is, therefore, important that the very earliest cases should be detected.

(3) Any man suffering from diarrhœa, fever, glandular swelling, pains in his bones, or general feeling of illness must report sick at once.

(4) The above diseases may be largely avoided by attention to the preceding instructions.

(5) The three diseases, typhoid, dysentery and cholera, are most usually acquired by water or food, and also by direct contact with the sick.

(6) Plague may be contracted by breathing the germs coughed up in lung cases, or may be carried by biting insects. The presence of many dead rats must be reported ; dead rats, if found, are not to be touched with the bare hands.

(7) Malaria is especially common in hot countries; the germ is carried by mosquitoes, which appear in great numbers after sunset; for camping grounds, an open space should be chosen, at a distance from any undergrowth or swamps, and especially not to leeward of these.

If possible men should not sleep on the bare ground, but should endeavour to obtain some waterproof material or some clean straw to lie on.

Windows of houses should be shut at sunset, unless they have been made mosquito-proof. Lights in a house attract mosquitoes. Camps should not be made near native villages, as these are always sources of infection.

Quinine is the remedy for malaria; malaria appears in the form of a short, sharp attack of fever; any man suffering in this way will report sick at once. In malarious regions the regular administration of quinine will prevent the appearance of malaria.

(8) Men are most earnestly warned that in countries out of Europe syphilis is nearly always an extremely severe or even fatal disease.

(9) In many foreign countries men are liable to suffer from intestinal worms; to avoid these one should never eat uncooked meat or drink unboiled water.

(10) As a safeguard against the bites of poisonous snakes, when moving about in thick undergrowth men are recommended to strike the bushes and to rap on the ground.

#### APPENDIX 2B.

##### NOTES ON TYPHOID FEVER FOR THE INSTRUCTION OF THE TROOPS.

*(Prepared in the Imperial Health Office.)*

(1) *Nature of the Disease.*—Typhoid fever is an infectious disease caused by the typhoid bacillus; many ill-defined cases of fever are really mild typhoid.

(2) *Course of the Disease.*—The illness begins gradually with headache, loss of appetite, and general feeling of being out of sorts. Soon after this the man begins to feel feverish and inclined to take to his bed. At the same time diarrhoea with light yellow stools begins; fever increases day by day during the first week of illness. The patient suffers a good deal from thirst, his tongue becomes coated, the lips dry, and sleep is disturbed. Fever remains high during the second week, and the patient becomes weaker and possibly delirious. At this time small rose-coloured spots may appear on his body. There is generally a little congestion of the lungs. About the third week fever begins to fall gradually, and in favourable cases has ceased by the fourth week, but at least another month is necessary for convalescence. In unfavourable cases the fever remains high, the patient becomes weaker and restless, and may die in the fourth or fifth week. The death-rate is from 5 to 15 per cent. Very mild cases may also occur.

(3) *Treatment of the Disease*.—Men attacked in the above way must report sick at the earliest opportunity. As the disease affects the intestines, the question of diet is of the greatest importance, and only such articles as are ordered by the doctor may be taken. Indulgence in other articles may produce bleeding from the bowel, tearing of the bowel, and even death. This danger is greatest during the period of convalescence, when the patient suffers intensely from hunger. The patient requires careful nursing in order to escape the formation of bedsores. The chances of recovery depend largely on careful nursing.

(4) *Mode of Infection*.—Germs of typhoid fever are contained in the stools, urine, and expectoration of the typhoid fever patient; a minute quantity is sufficient to cause the disease. If a drop of excretion from the typhoid fever patient happens to soil a healthy man's underclothing, bedding, or gets into his eating and drinking vessels, or into milk, fruit or salad, it may easily be swallowed by the man. Washing out drinking utensils in water contaminated with the typhoid germ may also cause the disease. Flies may carry the germs. Soldiers attending to typhoid patients may become infected by contact. On the other hand, if the infection gets into general food supplies or drinking water, it may give rise to an epidemic affecting hundreds of men.

(5) *Isolation of the Sick*.—A typhoid case must not be nursed at home, owing to the danger of infecting others. A typhoid patient should be sent to hospital as soon as possible. Should no hospital be available, then the patient must be placed in a separate room, and no unnecessary persons allowed to approach him. Anyone touching a typhoid patient or his bedding must immediately wash his hands in some disinfectant. The room should be furnished as simply as possible, and the floor should be wiped daily with a damp cloth. Articles of food or drink should never be partaken of in a room in which there is a typhoid patient.

(6) *Nursing Personnel*.—Men employed in nursing typhoid patients should wear a washable overall; after touching the patient or any of his excretions, the hands must be washed and disinfected in cresol. In washing a patient they must be careful not to splash the water about. They are especially cautioned never to take any food which has been left in the sick-room, or to sit down to any meal without disinfecting their hands.

(7) *Disposal of Stools and Urine*.—Typhoid patients must not be allowed to use a latrine. Their stools, urine, or any vomited matter must be collected in vessels which can be easily cleaned and disinfected. Before emptying any vessel the contents must be disinfected with quicklime, chloride of lime, or cresol, as laid down. Should no disinfectants be available, stools must be buried as far away from buildings and water supplies as possible, taking great care not to soil the ground. Any cloths used for cleaning utensils must be soaked for at least one hour in cresol or boiled before being sent to the wash. For cleaning the patient's mouth, nose, &c., it is wisest to use small pieces of lint which can be burnt immediately

afterwards. It may be noted that men who have recovered from typhoid fever may remain possible centres of infection for a long time; their excretions must be dealt with in the same way as that of a patient until a medical officer says it is no longer necessary.

(8) *Care of Bed-linen, Clothing, and Utensils.*—Bedding and personal clothing are to be soaked in cresol for one hour or boiled before being sent to the wash. Articles of clothing belonging to patients which cannot be washed are to be disinfected by steam, or if this is impossible well brushed over with dilute cresol solution. Utensils used by patients must be scrupulously cleaned with hot soda solution before being used by healthy men.

(9) *Disinfection of the Dwelling.*—Any soiling of the floor in the patient's room is to be covered with dilute cresol solution and left for an hour before being wiped up. After removal of the patient, the room and its contents will be thoroughly disinfected under the direction of a medical officer.

(10) *Food Supplies.*—The preparation, storing, or sale of articles of food in or near the room in which typhoid patients are cannot be permitted under any circumstances. During typhoid epidemics men are strongly recommended not to partake of water which has not been boiled, or of milk, fruit, or vegetables which have not been previously cooked.

(11) *Conveyance of Typhoid Patients.*—Typhoid patients should, if possible, be conveyed in ambulance wagons. It is not permissible to use public vehicles, trams, cabs, &c., for this purpose; should these unavoidably be made use of, the vehicle must be thoroughly disinfected. Infection may possibly be conveyed by means of the corpse of a patient dying of typhoid fever; the body should therefore be placed in a mortuary at the earliest opportunity.

#### *Notes on Disinfection.*

(1) *Dilute Cresol Solution.*—To prepare dilute cresol solution one part of the ordinary cresol which can be purchased in any chemist shop is mixed with 19 parts of water (that is, 4 tablespoonfuls to a litre of water). To disinfect vomited matter, stools, or urine, add an equal quantity of dilute cresol solution, thoroughly mix, and allow it to stand for one hour.

(2) *Milk of Lime.*—To prepare this, take one part of freshly burnt lime, well broken up, with 4 parts by measure of water, and mix them in the following way: Place the lime in a large vessel and add three-quarters of its bulk of water, stirring it continually. When the lime has taken up the water the remainder of the water is to be added and well stirred. If the milk of lime is not used at once it is to be kept in a closed vessel and well stirred up before use. As a disinfectant an equal bulk of milk of lime will be added to the contents of the receptacle and allowed to stand for one hour.

(3) *Chloride of Lime.*—Chloride of lime is only effective when freshly prepared, and must be stored in closed vessels; when in good condition

it emits a strong smell of chlorine. For use as a disinfectant two heaped-up tablepoonfuls are to be added to each pint of fluid to be disinfected, and well mixed by stirring with a stick; after twenty minutes, disinfection is complete. For disinfection of bath water four heaped-up tablepoonfuls of chloride of lime are to be stirred into the bath and allowed to stand for half an hour.

#### APPENDIX 6A.

##### MEDICAL STANDING ORDERS DURING THE CAMPAIGN.

(1) *Administration of the Medical Service.*—The medical service in South-West Africa will be administered according to Army Medical Regulations, except as otherwise directed in these orders.

(2) *Control.*—The whole military medical service will be controlled by the D.M.S., who will replace the former S.M.O. The Director of Medical Services is immediately subordinate to the general officer commanding the forces; he is the commanding officer of the whole official and medical *personnel* of hospitals, with the attributes of an Administrative Medical Officer of an army corps. In matters affecting the honour of a medical officer he has the same authority as an A.M.O. of a division or army corps. His office will be called "the Sanitätsamt," and is the headquarters for all medical and sanitary work in connection with the troops. The naval medical *personnel* will also be placed under his command.

(3) *Director of Field Hospitals.*—The Director of Field Hospitals will, in the absence of the D.M.S., act as his deputy. He is subordinate to the Inspector-General of Lines of Communication and D.M.S. of the forces. He is responsible for the construction of stationary hospitals, and will, if possible, supervise this work in person; he is responsible for the distribution of sick, and under instructions from the Inspector-General of Lines of Communication he will inspect the stationary hospitals on the lines of communication and be responsible for the sanitation in this area. He is not to be employed otherwise except under orders of the Inspector-General of Lines of Communication with the concurrence of the D.M.S. The Field Hospital Director is the immediate superior of all medical *personnel* employed in stationary hospitals and rest stations on lines of communication, and has the disciplinary powers of a commander of a battalion. In the event of his being disabled his duties will be taken over by the D.M.S.

(4) *Hospitals on Lines of Communication.*—Hospitals in existence before June 1st, 1904, will be classed as hospitals Lines of Communication, and will be under the command of the Inspector-General of Lines of Communication and the Field Hospital Director. The convalescent home in Abbabis will be classed as a hospital Lines of Communication.

(5) *Field Hospitals.*—Field hospitals will be numbered consecutively and will retain their number even in the event of their becoming stationary

hospitals. They are under the command of the General Officer Commanding and the D.M.S. They will be employed as detailed by the General Officer Commanding on the advice of the D.M.S.

(6) When established as stationary hospitals the field hospitals will come under the control of the Inspector-General of Lines of Communication and Field Hospital Director.

(7) *Non-dieted Hospitals at Fixed Posts.*—Non-dieted hospitals will be established where required. They will be under the charge of a medical officer with medical *personnel*, and will be under the command of the local commander. They may be established by any unit of the force, or by the Field Hospital Director, but this fact must be notified immediately to the Inspector-General of Lines of Communication and D.M.S. They will be withdrawn by order of the Inspector-General of Lines of Communication on the recommendation of the Field Hospital Director, and the fact reported to the D.M.S.

(8) *Chief Medical Officers.*—Each hospital will be controlled by a Chief Medical Officer, who will have the disciplinary powers of a company commander over the whole *personnel*, including patients, but not sick officers. The Chief Medical Officer of hospitals on the Lines of Communication will be subordinate to the local commandant, with the exception that should the commandant be junior in rank to the chief surgeon, then the local commandant shall not exercise any disciplinary control over the Chief Medical Officer.

(9) *Interior Economy of Hospitals.*—The interior economy of hospitals will be arranged by the D.M.S., if possible, in consultation with the supply officer. Hospitals will communicate directly with the D.M.S.'s office and the Supply office. The interior economy after July 1st, 1904, will be carried out in accordance with the medical regulations. Should local conditions render it necessary to make any modifications, it will be notified in the monthly report to the D.M.S.

(10) The medical reserve depôts will furnish hospitals and troops with medical supplies; requisitions will always be sent to the nearest hospital direct.

(11) *Staff-Surgeons.*—In Swakopmund, Karabib, and Okahandja, staff-surgeons will be appointed. They will be responsible for the hygienic condition of camps and quarters occupied by the troops and civil population in their stations. They will also undertake the treatment of all the military *personnel* not in hospital, except those belonging to regular units to which a medical officer has been attached, as also any civilian employees entitled to free treatment. They will also treat the natives living in their station. They are directly subordinate to the local commandant and Field Hospital Director, provided the commandant is of senior rank.

(12) *Medical Service on the Railway.*—The railway line will be divided into four sections, to each of which a medical officer will be appointed.

These medical officers are to supervise the supply of drinking water and the latrines, and to treat any military *personnel* or natives employed on the line; they are also directed to be on the alert for native women suffering from venereal disease, and arrange for their treatment.

(13) *Medical Personnel and Equipment with the Troops*.—Medical officers and subordinates are detailed to each unit. In the event of any of these becoming disabled, the fact is to be reported to headquarters, which will arrange for his relief. The equipment for the troops has been fixed on a special scale. In addition, filters and mobile water sterilisers have been supplied and are always to be made use of.

(14) *Health of the Troops*.—It is strictly forbidden to drink unboiled water. Filters must always be used, but can only be relied on to clarify water, and it is essential that the filtered water be boiled before use. If possible washing water is also to be boiled. The disease most to be feared is enteric fever, and medical officers must make a point of instructing the men and doing all in their power to prevent its occurrence.

(15) *Transport of Sick and Wounded*.—Sick and wounded will, as far as possible, be conveyed in ambulance wagons and not in supply wagons. They are to be provided with their own blankets, and, if necessary, with hospital blankets as well; a transfer certificate is to accompany each patient. If possible, some of the medical *personnel* will be entailed to accompany the convoy.

(16) *Selection of Men for the Campaign*.—No one is to be enrolled in the forces who has not been medically examined and found fit for tropical service.

(17) *Discharge from the Force*.—Men who become unfit for service in consequence of sickness or wounds are to be discharged as soon as possible. Sick and wounded who are not likely to recover in South Africa, but who would benefit by a change to Europe, are to be sent home. This does not apply to men whose permanent place of residence is in Africa. In the case of these men the procedure detailed in orders of February 1st, 1894, is to be carried out, and a certificate from the medical officer is to be furnished to the Principal Medical Officer's office. In the case of men sent out from home, it is sufficient to certify the necessity for sending them home, the proceedings being completed at headquarters. The certificate will show the following particulars: Serial number, name, corps, disease, and time in hospital, reason for sending home, any remarks. The certificate is to state whether the man is totally unfit for active service, or fit for service on the lines of communication. In sending men home a transfer certificate is sufficient. These cases will be reported to headquarters.

(18) *Admission and Discharge Books*.—Every company, battery, or other unit is to keep up an out-patient attendance book, as laid down in Appendix IV. of the Medical Regulations.

(19) *Periodical Returns of Sick and Wounded*.—On the 10th, 20th,

and last day of each month, telegraphic reports of the number of men actually sick on that day, with their units or in hospital, is to be furnished to the Principal Medical Officer's office, giving merely the actual numbers in the following order :—

- (1) Total number of patients.
- (2) Number of wounded.
- (3) Number of typhoid fever patients.
- (4) Number of malaria patients. The detachment commander's name.

Manuscript reports will be sent in as soon after as possible, showing admissions and discharges during the preceding ten days. These reports will give each man's name and full particulars, extracted from the admission and discharge books.

The telegraphic reports must be furnished by :—

- (a) All hospitals and rest posts.
- (b) The medical officer in charge of each detached party.
- (c) Every staff surgeon.

The Principal Medical Officer's office will compile these reports, and furnish a telegraphic report of the total number to Headquarters of the force. At the beginning of each month the Director of Medical Services will furnish a medical report on the events of the preceding month to headquarters for transmission home.

(20) *Deaths, Epidemic Reports, Fights, or any Special Circumstances.*—Every death is to be immediately reported by telegraph to headquarters, giving the christian and surname, corps, place of birth, and nearest relative, as well as the cause of death. In case of death from disease the primary cause of illness is to be given. Any epidemics are to be reported by telegraph to the Director of Medical Services. As soon as possible after any fight the medical officer is to furnish a written report of the number of wounded, showing the nature of the wounds, treatment given, and disposal of the wounded. Any suggestions for the improvement of medical or sanitary matters, and medical equipment are to be furnished without further orders to the Director of Medical Services.

(21) *General Obligation of the Medical Personnel.*—Although special medical officers are told off to each unit, any man asking for medical advice from any surgeon, other than his own, is to receive it.

(22) *Morning Sick and Health Examinations.*—The sick will be seen each morning. Sick will usually be seen by junior medical officers. Staff surgeons will see morning sick in their own stations unless an assistant is detailed. In every corps and garrison health inspections will be held three times in each month. At these inspections the men will be entirely stripped.

(23) *Treatment of Convalescents.*—Families of soldiers belonging to the Colonial force, as also any Government servants, are to be treated free of

charge. Such persons can only be admitted to military hospitals if there is room to spare.

(Sd.) VON TROTHA,

*Okahandja*, 1894.

*Commander-in-Chief.*

Slight modifications were introduced from time to time, but did not materially alter the above instructions.

## APPENDIX 6B.

### SCHEDULE OF QUESTIONS ON MEDICAL OFFICERS' EXPERIENCES.

The officer's name, rank, and the appointment held in the force when the following observations were made are to be filled in.

*Observations in Reference to :—*

#### I. *Accommodation, Food, and Clothing of the Troops.*

(a) *Accommodation.*—Suitability of various kinds of tents in use, construction of huts or shelters by means of stones, boards, or other materials.

(b) *Water Supply and its Sterilisation.*—Suitability for field service and capacity of yield, in the case of sterilising apparatus and Berkefeld filters, both for pack and wheeled transport, also clarification by alum and boiling water.

(c) *Feeding.*

(d) *Clothing.*

(e) *Latrines, Conservancy, Disposal of Dead Animals.*

#### II. *Equipment of the Troops with medical personnel and material.*

On the number of medical subordinates which should be provided for each detachment. Special observations in reference to the subordinate personnel, e.g., N.C.O.'s of the reserve, ward attendants, &c. :—

(a) *Accommodation of Sick.*—Buildings, tents, houses constructed by the troops, or temporary shelters; lying-down accommodation and the methods of improvisation employed.

(b) *Dieting.*

(c) *Supply of Medicines.*—Field medical panniers, boxes, the number, size, weight, and transport, packing, and contents, dressings, supply of instruments, thermometers, &c.

(d) *Transport of Sick.*—Ambulance wagons, G.S. wagons, ox wagons, improvised methods of carriage, stretchers.

#### III. *Infectious Diseases.*

(a) *Typhoid.*—Method of spread and infection, result of preventive measures, e.g., change of camping ground, &c., anti-typhoid inoculation in relation to number and severity of attacks.

(b) *Malaria.*—On the institution and results of quinine prophylaxis.

#### IV. *Any other Observations or Suggestions.*

## APPENDIX NO. 22.

EXTRACT FROM THE DETAILED INSTRUCTIONS FOR MEDICAL OFFICERS  
APPOINTED TO EXAMINE MEN SENT HOME FROM SOUTH AFRICA.

When considering the question of invaliding it must be remembered that most of the men returning from South-West Africa have already spent a considerable time in hospital there; in addition to which, they have had a four weeks' comfortable sea journey which should have tended towards their recovery. It may, therefore, be assumed that any disability which is found to be present on the man's arrival in Germany is of a chronic nature from which he is not likely to recover soon, and will probably require at least one year for rest and treatment. When considered advisable these men may be sent to watering-places. In the case of senior N.C.O.'s who wish to continue to serve, treatment in hospital may be tried, provided there is a reasonable prospect of success. Men who are entitled to a special furlough of four months should not be finally disposed of till the expiration of this time, as there is a great probability of marked improvement taking place in their condition.

Men are not to be sent to watering-places unless there is a reasonable prospect of their deriving benefit from this treatment. Suitable cases are those requiring treatment by medico-mechanical means for disability following wounds or chronic rheumatism. When possible a watering-place will be chosen near the man's home. Cases of tubercle or suspected tubercle are to be invalided at once, and should be instructed to apply to their district commandant for admission to a sanatorium.

Men who have recovered from their disability are to be shown as fit for field service, if necessary, after a certain period of rest. In cases of heart affection, it must be remembered that these men have had at least four weeks' rest, and it is, therefore, probable that any existing lesion would be aggravated by hard work. It is, therefore, wiser to invalid these men out of the service at once.

Men suffering from the milder forms of organic heart disease may be dealt with at once, but it is important that these men should not undertake heavy work immediately; accordingly, in estimating their disability for earning a livelihood in civil life a liberal view is to be taken.

Men requiring dental treatment are only to be recommended for it when it is clearly shown that they have lost a number of teeth during the campaign and that treatment is absolutely necessary in order to restore the power of mastication. Artificial dentures are only to be recommended in exceptional cases, the man is to be advised to go to a dentist at his own expense, but may, however, apply to have a portion of the cost paid out of expeditionary funds. In every case in which payment is made from imperial funds, the man is to be given a copy of the circular "Teeth instruction," given below.

*Instruction for Dental Treatment.*

For (Name) who requires dental treatment and artificial teeth.

(1) Within eight days after arrival at his home he is to report to the appointed dental surgeon at.....

(2) This dentist is to furnish an exact estimate as to cost of the necessary work, using the cheapest material and quoting the lowest rates shown in circular of May 15th, 1896, for contract dental work. If the man desires to have more expensive work put in he must pay the difference himself. This estimate, together with this instruction leaflet, is to be transmitted immediately to the headquarters of the colonial troops in Berlin.

(3) The dental treatment is to be undertaken as soon as permission has been given from headquarters, and should be finished in as short a time as possible. The bill is to be sent by the dentist to the Imperial Colonial Office.

(4) The dentist must give a guarantee that the work has been properly done.

## Travel.

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### THE NORTH-WEST FRONTIER OF INDIA.

By MAJOR R. J. BLACKHAM.

*Royal Army Medical Corps.*

THE north-west corner of the Indian Empire is a part of the world to which most of the officers of the Corps find their way at one time or other during their service; some to obtain medals and honours, others to merely bear the heat and burden of the day.

In many ways it is the most important area in our great overseas Empire, yet although information with regard to several Indian cantonments has been published from time to time, no account of the frontier has yet appeared in these pages.

As the Travel Section of the Journal and the proposal to prepare a Corps Gazetteer have always been attractive to the present writer, he ventures to offer a brief description of that portion of the Indian border, which is occupied by the premier division of the Indian Army, in the hope that it may not be without interest. He is

indebted to the *Imperial Gazetteer of India*, and the *Official Gazetteer* of the Peshawar District, for most of his facts and not a few of his phrases.

*Geographical Position.*—The First Division is located in the Peshawar Valley and its vicinity, between north latitude 33° 40' and 34° 31', and east longitude 71° 25', and 72° 47'. There are only four stations of importance, Peshawar, Nowshera, Mardan and Cherat. The last named is closed from the end of November till the beginning of May.

Peshawar, Nowshera, and Cherat are the only cantonments with European garrisons. There are ten important land forts on the strength of the Division, including the far-off outposts at Drosh and Chitral.

The Division guards the extreme north-west of the Indian Empire and has the military control of the territory between the Indus and the Khyber mountains. Except on the south-east side, where flows the Indus, its cantonments and forts are encircled by mountains occupied by independent Pathans.

*History.*—Peshawar has passed through many vicissitudes in history, and has been the scene of the exploits of many dynasties.

It was included in the Mogul Empire during the reigns of Akbar, Jahangir, and Shah Jahan; but under Aurangzeb a national insurrection was successful in freeing the Pathan tribes from the Mogul supremacy.

In 1738 the district fell into the hands of Nadir Shah, and under his successors Peshawar was often the seat of the Durrani Court. On the death of the Timur Shah, in 1793, Peshawar shared the general disorganisation of the Afghan kingdom, and the Sikhs, who were then in the first fierce outburst of revenge upon their Mohammedan enemies, advanced into the valley in 1818, and overran the whole country to the foot of the hills. In 1823, Azim Khan made a last desperate attempt to turn the tide of Sikh victories, and marched upon Peshawar from Kabul; but he was utterly defeated by Ranjit Singh, and the whole district lay at the mercy of the conquerors. The Sikhs, however, did not take actual possession of the land, contenting themselves with the exaction of a tribute, whose punctual payment they insured or accelerated by frequent devastating raids. After a period of renewed struggle and intrigue, Peshawar was reoccupied in 1834 by the Sikhs, who appointed General Avitabile as Governor and ruled with their usual fiscal severity.

In 1848 the Peshawar Valley came into possession of the British

and was occupied almost without opposition from either within or without the border. During the Mutiny the Hindustani regiments stationed at Peshawar showed signs of disaffection and were accordingly disarmed with some little difficulty in May, 1857. But the 55th Native Infantry, stationed at Nowshera and Hoti Mardan, rose in open rebellion, and on a force being dispatched against them marched off towards the Swat hills across the frontier. Nicholson was soon in pursuit and scattered the rebels with a loss of 120 killed and 150 prisoners. The remainder sought refuge in the hills and defiles across the border, but were hunted down by the clans, till they perished of hunger or exposure, or were brought in as prisoners, and hanged or blown away from cannon. This stern but necessary example prevented any further act of rebellion in the district.

*Population.*—The civil population of the Peshawar district of the North-West Frontier Province was, according to the census of 1901, constituted as follows: Males, 401,515; females, 251,922; making a total of 753,437.

This district covers the entire area in the military jurisdiction of the 1st (Peshawar) Division, with the exception of the forts at Dargai, Malakand, Chakdara, Drosh and Chitral, which are military outposts surrounded by territory occupied by frontier tribes within the political supervision of the Agent to the Governor-General.

The average civil death rate of the district is 37·4.

The military population of the Division is composed as follows: British troops, 4,157; Native troops, 13,451.

The general average of sick was, according to official returns dated August 1st, 1909: British troops, 8·46 per cent.; and Native troops, 2·23 per cent.

The bulk of the population of Peshawar is formed by Pathans, an interesting race who also form the bulk of the trans-frontier foes which the Indian Army has to deal with from Jamrud to Cabul. They are a race of agriculturists of the Biblical type, who till their land with the ploughshare in one hand and the sword, symbolised in their case by a modern small-bore rifle, in the other. They are a cheery race and generally abstemious, the use of opium and spirits being regarded as disreputable outside the towns.

Hospitality is a characteristic of the Pathan, and every village has its guest-house, maintained by the headman or a few of the leading villages. An unlimited supply of beds, blankets, and food is the mark of a true Pathan headman, and to a great extent his influence depends on his extravagance in entertaining. An ordinary

guest receives bread and some condiments, but for an honoured guest a fowl, and for a powerful chief a sheep or goat is killed. The guest-house is also used as a village club where residents and villagers assemble to smoke and talk, and the bachelors of the village sleep there, as Pathan custom does not allow them to sleep at home after reaching man's estate.

Most Pathans are fond of field sports, such as hawking, hunting with dogs, and shooting. Frequently they combine with these the more exciting pleasures of highway robbery, cattle-lifting, and burglary. In parts of Kohat a favourite pastime is to beat the low jungles at night with blazing torches, so that hares or partridges that may be disturbed are dazzled and secured. In the north fighting rams and quails afford great amusement, and young men play a wrestling game rather like cock-fighting. Farther south tent-pegging is the national game, and on every occasion of rejoicing all who own horses assemble for the sport. In default of a wooden peg an old grass sandal will serve. Everybody is fond of music, singing and dancing, and the half Gregorian style of music affected by the minstrels is not displeasing. It is claimed for them that they distinguish intervals too subtle for the European ear to appreciate, though they know nothing of harmony, and consider European music mere noise. The recitations of the minstrels are sometimes epic in character, but love-songs and burlesques are favourite subjects also. Some of the latter are witty and do not spare British officials. Often, however, both recitation and gesture are obscene.

*Topography.*—The surface configuration of the tract of country in which the Premier Division of the Indian Army is located is very uneven and dissimilar.

To the north-west it includes the low-lying riverain tract, situated between the branches of the Kabul River, down to their junction with the Swat. This is often swampy and is intersected by a complicated system of interlacing cuts from the different branches of the river.

To the south and west of the Budni, as the most southerly branch of the Kabul River is called, the country rises rapidly to the Afridi Hills. To the north of the Kabul River is a small riverain tract in which Mardan is situated, but the rest of the area consists of high unirrigated land which ends at the marble rocks in Nowshera Kalan.

South of the Kabul the hills extend close to the river, and this tract includes the montanic region known as the Khattak Hills, in which Cherat is situated.

Peshawar cantonment and city occupy positions in the south-west of the Civil District, the most swampy portion of the tract. The country immediately to the north of Peshawar is as bad as any in the district, which, according to the *Official Gazetteer*, probably accounts, in part, for the notorious unhealthiness of the city and cantonment.

A curious feature of the neighbourhood is that the people, though willing to spend money and labour freely on the construction of watercourses, have practically to be compelled to dig the most necessary drains; and without actual compulsion it is almost impossible to get them to combine for such work, although without it the land becomes so waterlogged that it cannot produce anything, and is useless for agricultural purposes.

*Geology and Flora.*—There are many points of remarkable interest in the geological formation of the valley of Peshawar. Even to cursory observation it presents the appearance of having been, remote centuries ago, the bed of a vast lake, whose banks were formed by the surrounding Himalayas and whose waters were fed by the rivers which now flow through a vast and uneven plain.

The whole surface of the district exhibits marked evidence of mechanical effects of currents, waves, springs, streams, and rivers which at one time were pent up, but which, in course of time, have created outlets through the weakest range of the surrounding hills.

The hills which hem in the valley are abrupt, irregular and barren, and consist of metamorphic, clay slate, and mica schist; whilst those beyond the frontier rising to the plateaux of Jellahabad and Cabul present every variety of geological formation, becoming, as they recede towards Central Asia, magnificent pine-covered mountains enclosing temperate and fertile valleys.

The Peshawar Plain belongs to the Post-tertiary, or recent, system, covered by accumulation of alluvial deposits consisting entirely of clay silts, sand, gravel and boulders.

Throughout its entire extent the valley is studded with worn shingle or boulders, and fresh-water shells are everywhere found belonging to the genus *Planorbis* or *Helix*.

The valley has passed through slow and successive changes. At first it was probably a large lake; then, as the water-level decreased in consequence of an outlet being found in the Khattack Hills, it became a vast tropical marsh, rank with weeds and tropical vegetation, and a favourite haunt of wild game, as we have historical evidence in the memoirs of the Emperor Babar, dated

A.D. 1519, that rhinoceros was hunted in the neighbourhood of Malakand in the sixteenth century. This great jungle in its turn gave place to the valley as we now know it, fertile, beautiful, and alas! feverish.

The distribution of trees varies in different parts of the valley. Many varieties are plentiful in the irrigated districts such as the vicinity of Peshawar and Mardan, whilst few are to be found in the vicinity of unirrigated districts such as Nowshera. The hills are covered with a few wild olives and scrub, and, in consequence, present a singularly uninviting appearance.

There are numerous fruit gardens and orchards in the western suburbs of Peshawar City where the vine, fig, plum, apricot, peach, and quince grow luxuriantly, whilst melons and all the ordinary vegetables of Northern India are produced in great plenty in all parts of the district where water is plentiful.

*Watercourses.*—The Indus River forms the south-eastern boundary of the district and receives at Attock the Cabul River, which has previously collected almost the entire drainage of the Peshawar Valley.

Of the Cabul the principal affluents are the Swat from the north-west, the Bara from the south-west, and the Kalpani from the north.

The Cabul, Swat, and Bara unite with the Budni at Nisatta, 14 miles north of Peshawar, to form the Landai, or lower section, which, after a course of 36 miles, falls into the Indus near Attock. The Cabul River provides most of the irrigation in the neighbourhood of Peshawar and Nowshera, fertilising by its canals some 70,000 acres.

The Swat irrigates a large area far from the vicinity of the chief cantonments, but the Bara River is of enormous interest to the military population of Peshawar, as it furnishes the water supply and irrigation water for the "Garden of Northern India." As it enters the Peshawar District the Bara is a diminutive stream, but it is fed by some clear and copious streams in the neighbourhood of the fort to which it gives its name.

These springs are celebrated for their salubrity, and many of the Sikh Sirdars caused supplies of water from them to be brought to Peshawar in closed vessels. The area dependent on the Bara amounts to 38,782 acres, and includes some of the richest and most fertile land in the province. The irrigation water from Mardan and its vicinity is obtained from the Kalpani River. This river also indirectly furnishes the water supply for Nowshera Cavalry Cantonment through wells sunk near its banks.

Irrigation was originally an absolute necessity throughout the Peshawar district, as the depth of water from the surface is so great that it is impossible to work wells for purposes of cultivation except in the low lands which fringe the rivers, such as the neighbourhood of Nowshera.

The system was introduced as far back as the time of Aurangzeb and the British engineer has done little but develop the existing system.

In the matter of utilising irrigation in agriculture the Pathan is so ingenious that at times he appears to be almost able to make water run uphill.

Unfortunately, as has been shown, he shows no enthusiasm in encouraging drainage, and the result is that the whole valley is now waterlogged throughout its entire extent, and the subsoil water is in some places in the neighbourhood of Peshawar within a few inches of the surface.

*Climatology.*—Four seasons are recognised in the Peshawar Valley :—

Spring includes the months of February, March, and April. During this season there are occasional hail-storms, and rain falls to the extent of 3 or 4 inches. The air is cold and bracing, but the thermometer runs high (*vide table*).

Summer includes May, June, and July. During this season the air is densely hazy, dust-storms being of almost daily occurrence during the last two months of the period. Thunder-storms are of common occurrence on the bordering hills, and often the dust-storms are followed by considerable electric disturbance, but rain rarely falls in the plains. This is the hottest (*vide table*), and at the same time is regarded by the natives as the healthiest period in the plains.

Autumn includes the months August, September, and October. This season is ushered in by the hot-weather rains. These break over the valley in four or five violent storms at intervals of a few days. Two or three inches of rainfall are usually registered on each occasion. During the first half of this season the sky is more or less uniformly overcast with clouds, and the air is heavy and stagnant, except for a brief interval immediately succeeding a fall of rain, after which it becomes steamy and oppressive. These months constitute the true malarial season, as the still air and complete absence of breezes must be especially grateful to the mosquito and conducive to its vitality and comfort, as we know that it dislikes wind above all things.

Winter is included in the months of November, December, and January. During this season the weather is variable. The sky is at first hazy, then cloudy with sometimes slight rain, and finally becomes the clear, cloudless blue of the Indian winter. There is a remarkable absence of wind generally, and at Peshawar especially the air is still and stagnant. The days are sometimes hot, but the nights and early mornings are always cold. Owing to the large amount of moisture in the air, the cold of the Peshawar winter—although low temperatures are rarely registered—is very trying, even to Europeans accustomed to the rigors of a continental winter. The direction from which the wind generally blows in Peshawar is from the west, or down the Khyber Pass, but there is really no prevailing wind, a generally stagnant atmosphere being the characteristic of the valley. The main difference between the climate of Peshawar and that of the Punjab consists in the length and severity of the Peshawar winter. Its bracing character partly compensates for the extreme heat of the summer and the absence of a regular monsoon.

*Sports and Amusements.*—The fauna is meagre, yet notwithstanding this fact some of the best snipe-shooting out of Burmah is obtainable at Peshawar during the months of February and March. *Markhor* are found on the Pajja spurs, which jut out from the hills north of Mardan, and occasionally near Cherat, where *urial* are also seen. Wolves and hyenas are not numerous, but leopards are still met with, though rarely.

The Peshawar Vale Hunt maintains an excellent pack of hounds, the only one in Northern India, and affords capital sport to the large garrison of Peshawar. The meets take place at from 6.30 to 7.30 a.m., and as they are generally held from five to twelve miles from Peshawar, this means an early start and a shivering journey along dark roads in the intense cold of the frontier winter. Wrapped up in a *poshtin* or camel-skin coat of the country, one defies the cold, and the splendid runs of forty-five minutes over what is, perhaps, the best hunting ground in the Tropics are ample compensation for any discomfort involved.

The polo at Peshawar is as good as the hunting, and the polo grounds have to be seen to be appreciated. They are real grass grounds, always kept in the pink of condition.

There are several grass tennis-courts, a good grass cricket pitch, and last, but by no means least, first-rate golf links with *real* greens, instead of the "browns" with which the golfer in most Indian stations has to be content. There is also fishing in many of the streams near the hills.

So, taking it all round, there are many worse Commands in which to put in a foreign tour than the 1st Division of the Indian Army.

TABLE  
MAXIMUM AND MINIMUM TEMPERATURES AT PESHAWAR DURING THE DECENNIUM  
1899-1908.

MAXIMUM TEMPERATURE.												
Year	January	February	March	April	May	June	July	August	September	October	November	December
1897	59.0	65.6	72.3	79.9	97.9	102.3	104.4	95.8	94.6	90.4	79.6	65.8
1898	67.6	66.7	72.7	92.0	96.9	109.9	99.8	102.1	94.2	89.2	77.6	67.3
1899	64.0	66.1	77.6	87.5	105.8	106.7	104.0	101.6	98.9	88.7	78.8	69.9
1900	61.3	64.9	79.2	80.6	95.4	106.9	106.5	100.0	94.5	86.9	78.7	65.0
1901	59.9	64.7	76.9	84.1	95.0	105.1	106.0	103.9	94.9	89.2	79.2	69.1
1902	69.7	74.6	79.0	87.4	102.7	105.9	103.3	103.5	97.3	86.8	75.8	68.4
1903	63.7	69.0	69.2	80.2	91.6	108.0	103.5	101.9	97.8	90.8	77.7	66.6
1904	57.3	71.3	71.5	86.9	98.9	109.6	103.5	98.2	94.3	87.0	74.8	66.7
1905	58.3	57.9	66.3	81.8	99.1	107.8	105.4	103.3	95.0	88.6	78.3	63.8
1906	62.5	60.0	71.5	82.9	99.1	105.4	104.1	98.8	94.2	88.4	79.1	67.1
1907	65.7	61.0	68.0	80.3	95.2	100.6	104.0	99.2	99.2	89.0	79.1	67.7
1908	62.8	65.6	74.9	83.3	96.3	108.8	101.5	95.8	89.6	85.3	76.0	64.2
MINIMUM TEMPERATURE.												
Year	January	February	March	April	May	June	July	August	September	October	November	December
1897	40.2	44.3	50.2	58.1	60.3	73.9	78.4	76.6	69.7	56.9	45.3	44.1
1898	40.9	44.1	51.5	62.6	68.1	79.3	77.7	80.0	71.5	57.0	43.0	38.9
1899	35.0	44.7	54.6	59.9	73.2	78.5	81.4	77.0	70.5	57.3	49.9	43.7
1900	38.5	44.3	55.1	57.6	69.6	76.7	80.8	78.5	74.8	57.7	50.2	42.2
1901	39.1	40.8	53.3	57.7	69.2	74.9	79.9	81.0	69.3	60.3	46.3	38.5
1902	38.0	44.3	53.0	60.7	72.7	78.3	79.0	77.5	70.4	60.6	48.9	36.6
1903	38.0	44.8	49.4	57.0	67.3	77.3	77.1	77.5	72.2	59.5	47.9	37.8
1904	42.2	43.9	53.2	61.3	70.0	78.0	79.1	77.0	69.3	59.1	49.3	41.6
1905	39.8	35.3	46.8	56.9	71.9	78.8	81.7	80.7	70.5	58.5	49.1	41.7
1906	37.5	43.9	51.2	58.8	72.0	77.7	80.9	78.8	73.2	61.9	49.0	45.2
1907	44.6	44.4	48.5	59.9	66.8	72.7	77.1	78.0	71.9	59.6	48.6	35.7
1908	41.8	43.7	51.3	62.2	69.1	79.3	80.8	77.3	69.9	58.6	47.1	38.8

## Reviews.

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IMPROVISATION IN FIELD MEDICAL WORK. *Behelfsvorrichtungen beim Sanitätsdienste im Felde.* Westphal, Surgeon-Lieutenant in the Guards. 8vo. Pp. 218. 99 illustrations. Berlin: Hirschwald. 1910.

This handy manual, the twenty-ninth volume of the Coler- v. Schjerning series, was originally intended to be merely an essay on the expedients adopted by German medical officers in the late Herero Campaign, but at the suggestion of v. Schjerning, Director-General of the Prussian Army Medical Service, Westphal has drawn freely upon other sources in order to make it a complete handbook for medical officers on improvisation and self-help generally in the field.

The first three chapters are merely introductory; the next gives a review of emergency first-aid on the battlefield. The fifth chapter discusses fully the evacuation of wounded by means of locally adapted transport, and should prove of great value to our voluntary aid detachments.

The erection of temporary shelters is next briefly dealt with; the following chapter contains some notes on the preparation of emergency hospitals in existing buildings.

Hospital management occupies the eighth section and contains a great many practical hints on the improvisation of articles required for ward equipment, as well as on cooking, washing, &c., and the employment of convalescents.

The ninth section is on sanitation, and although not very full, yet contains some practical suggestions.

There is a good bibliography and the book is well illustrated. It should prove of great service to medical men as a guide to improvisation in any emergency.

C. E. P.

DISINFECTION OF THE HANDS WITH ALCOHOL. *Veröffentlichungen aus dem Gebiete des Militär-Sanitätswesens, herausgegeben von der Medizinal-Abteilung des Königlich. Preussischen Kriegsministeriums.* Heft 44. Berlin, 1910. 89 pages.

This book contains ten separate contributions on alcohol sterilisation by medical officers of the German Army. Stabsarzt Dr. Kutscher gives a review of previous work. Reinicke in 1894 recognised the value of alcohol. Twelve years later Schumburg advocated its use after a long series of investigations. The purification of the hands by means of 96 per cent. alcohol does not depend on germicidal action, for it has none. Hüne and Schwarz confirm earlier researches, and show that streptococci, staphylococci, and *B. pyocyaneus* survive immersion for twenty minutes in 90 per cent. to 96 per cent. alcohol. It might be wrongly assumed that soap and water would then be as effective as alcohol. The experiments of Kutscher prove that cleansing the hands with soap, water, and nail-brush does not always cause a marked diminution in

the number of colonies of bacteria grown in agar, in which, while fluid, the fingers have been rinsed before and after washing. Noetel's experience is similar. Jacobitz and Hammer, however, found that soap and water alone would effect a reduction of 80 to 90 per cent. in the *B. coli communis* with which the hands had been contaminated. The preliminary use of soap and water is recommended by all except Noetel, who regards this as superfluous, or even harmful, on account of the lowering of the concentration of the alcohol by the water retained in the epidermis. A series of experiments by Otto supports his contention. The concentration of the alcohol should not be less than 90 per cent. The hands and forearms are rubbed with pieces of gauze soaked in this spirit, which is not to be contaminated by the return of the swabs after use. This should be continued for three minutes. If the application is more prolonged the hands are liable to become cracked and fissured. The numerous experiments described in these reports are concordant in indicating that a constant reduction of the number of bacteria which can be grown in agar occurs, amounting to over 99 per cent. This diminution persists for half an hour. Alcohol owes this property to its power of removing greasy matter, and on its shrivelling and hardening effects on the epidermis and on the bacteria themselves. The bacteria are retained, but not destroyed. That the alcohol causes the micro-organisms to adhere to the skin, just as it fixes them to a glass slide for microscopical examination, is demonstrated by an experiment by Kutscher. Simple immersion of a hand in alcohol for five minutes lessened the bacteria from 40,000 to 8. Nevertheless, thorough rubbing of the skin with gauze and alcohol effected a longer freedom from germs than soaking alone. Similar observations had been made by Meissner. Rammstedt draws attention to the harm resulting from the application of alcohol to wounds or abrasions. Not only is it very painful, but it fixes the living bacteria in the tissues.

The merits of alcohol and sublimate, acetone and alcohol, ether and alcohol, alcohol containing 0.5 per cent. nitric acid, alcohol and 1 per cent. formalin, were compared bacteriologically. They gave no better results than alcohol alone, and caused more injury to the skin. Rammstedt, however, prefers methylated spirit, which contains  $\frac{1}{2}$  per cent. nitric acid, and Schunacher 1 per cent. formalin in alcohol. Möle finds that the hands are less sensitive to the acid alcohol than to the formalin.

Mikulicz's soap-spirit is condemned. Since alcohol disinfection entails the use of 100 cc. of 90 to 96 per cent. spirit for each pair of hands, it is obvious that transport difficulties will limit its practice in the field. Here purification of the skin by painting it with tincture of iodine will find its place, and asepsis can be preserved by wearing gloves. Hune, Schwarz, and Rammstedt recognise the limitations of alcohol sterilisation in the field ambulances and clearing hospitals, but advocate its employment in stationary hospitals. \*

C. B.

## Current Literature.

**On the Use of "Antiformin" for the detection of Tubercle Bacilli in Sputum, &c.**—R. C. Paterson (*Journal of Medical Research*, April, 1910, p. 315) states that antiformin is the patented name of a disinfectant which was introduced in 1900 by Victor Tornell of Stockholm as a cleansing material for vats in breweries. It has been brought into prominence since 1908 by Uhlenhuth and Xylander's investigations on its use in bacteriological and hygienic work. Antiformin consists of equal parts of liquor sodæ chlorinatæ B.P., and of a 15 per cent. solution of caustic soda. *Staphylococci*, *streptococci*, *B. coli* and *B. typhosus* are killed in five minutes by a 2 per cent. solution. Antiformin does not deteriorate with age. Paterson adds 2.5 cc. of antiformin to 10 cc. of sputum, allows the mixture to stand for twenty-four hours, centrifugalises and washes the sediment, which is spread in films and stained in the usual manner. In the sputum of twenty-three cases no tubercle bacilli were detected in smears, yet in five they were discovered after the antiformin treatment. Meyer examined ninety-nine sputa, negative in smears, and found fourteen positive after the use of antiformin. Lagrèze also thus attained success in 20 per cent. of fifty otherwise negative cases, Rau five times out of eighteen. This method gives better results than the ligroin and antiformin-ligroin processes recently advocated by Lange and Nitsche.

Solutions of antiformin while destroying the ordinary contaminating bacteria leave tubercle bacilli unharmed. It is therefore an aid in cultivating this bacillus from the sputum and towards preventing sepsis in inoculation experiments.

C. B.

**The Epidemic of Typhoid Fever in the Garrison of Saint-Brieuc in 1909**, with special reference to the atypical cases. (*Méd. Princip. Billet and Méd. Majors Le Bihan et Louis. Archives. de Méd. et de Pharm. milit.*, April, 1910). These officers were deputed to investigate this epidemic of typhoid fever and to recommend such sanitary precautions as appeared necessary.

One of the main objects was to detect unsuspected cases which living in barracks among their comrades acted as foci of disease. In order to accomplish this the commission arranged to examine every man of the regiment, taking one battalion a day, so that each man was seen every fourth day. All men belonging to the battalion to be inspected were ordered to go to their rooms and lie down on their beds with all their clothing opened up so as to expose the chest and abdomen. Any men showing any signs of malaise, of enlargement of the spleen, abdominal spots, congestion of the fauces, &c., or giving any suspicious history, were isolated and kept under observation. In some cases blood cultures were made, in most cases the serum reaction was tried and in all cultures of the stools were taken. In all, fifty-seven atypical cases were detected; fifteen were treated in hospital and the remainder in a special barrack room. A list of cases is given showing the symptoms and tests employed;

in the great majority of cases the diagnosis appears to have been based on a positive serum reaction. A long description of uncommon symptoms is given of which the following may be noted. In a few cases pyrexia was noted for periods of two to eight days, but in thirty-four cases there was no rise of temperature at all:—

In fifteen cases there was merely malaise, headache, tympanites, furred tongue, and loss of appetite.

In two cases there was simple diarrhoea, in eight others diarrhoea with rose spots. In eight cases constipation was the only symptom of illness.

Enlargement of the spleen alone or accompanied by diarrhoea was observed ten times. Rose-coloured spots were the only symptoms found in eight cases and in four others were present along with enlargement of the spleen and some intestinal disturbance. The frequency with which rose-coloured spots was the only symptom found was somewhat surprising. Another interesting symptom was stiffness of the neck, noted five times. Sore throat was observed four times.

The risk of contact infection is shown by the fact that seven out of thirty-five hospital attendants (= 20 per cent.) contracted typhoid fever in some form, the bacillus being in each case recovered from the stools. Among the cooks four men were admitted to hospital for typhoid fever, while eight others were found to be suffering from atypical forms of the disease—i.e., 42·8 per cent. of the kitchen personnel were infected.

*Laboratory Tests.*—The blood cultures were made by drawing off 10 cc. of blood from a vein into Conradi's bile-peptone-glycerine medium.

In the case of faecal cultures the bowel was washed out on three successive occasions at intervals of two hours, samples of faecal matter were then placed in glass tubes packed in ice and sent direct to the laboratory. The media used were Drigalski's, Conradi's, or Endo's.

*Blood Cultures.*—These were made in seventy-one cases admitted to hospital for typhoid fever and in fifty (= 70 per cent.) the bacillus was found. Among thirty-nine suspected cases under observation the bacillus was recovered seven times. Among fifty-three healthy men who had been exposed to infection the bacillus was recovered in only one case.

*Serum Diagnosis.*—A positive result was obtained in forty-two cases out of 113 men under observation. Two positive reactions were obtained from fifty-three men who occupied the same rooms as men admitted to hospital for typhoid fever. Among 226 men who were to be granted a furlough to their home nineteen positive reactions were found.

*Cultures of Faeces.*—(a) Among 113 convalescents the bacillus was found in thirteen cases (= 11·4 per cent.); (b) among sixty-four atypical cases the bacillus was found in thirteen cases (= 20·3 per cent.)

It thus appears that the atypical cases furnished nearly twice as many carriers as the well-defined cases of typhoid fever.

C. E. P.

**Malingering.**—In the *Deut. Mil. Zeitschr.*, No. 13 of 1909 and No. 4 of 1910, Oberstabsarzt Blau has two further articles on malingering, the material for which he has obtained from Russian sources. Judging by the published reports from Russia it seems that the production of disabilities by artificial means has been adopted as a profession by certain persons who make a special study of the subject and carry out the various procedures on scientific lines.

*Artificially-Produced Herniæ.*—Seven cases of this nature were reported by Dietz and two others by Cubarew. The characteristics of this condition are: (1) The atypical condition of the lesion; (2) the ring is represented by a slit-shaped opening; (3) the peculiar shape of the upper and outer angle of the opening; (4) the large amount of scar tissue and adhesions; (5) the irregular direction of the fibres in the intercolumnar fascia; (6) the very firm adhesions to the bowel; (7) the vas is embedded in scar tissue.

Men presenting themselves with artificial herniæ were sent to join their units and do their duty; some asked to have a radical cure performed, while others served on in spite of the condition. The number invalidated for hernia in the Russian army in 1906 was  $226 = 1.7$  per 1,000 of strength, and 4.2 per cent. of the total number invalidated.

Wosskressensky investigated the mechanism of the production of hernia in corpses. He found that by introducing glove stretchers into the ring and using moderate force the ring could be dilated to twice its normal size or even more, but that neither external nor internal ring could be torn open. By employing great force and using iron tongs the ring can be torn open, but it would rarely be possible to find any man willing to submit to the violence required. As a result of examining some 3,000 men, several of whom were suffering from hernia, he has come to the conclusion that the so-called artificial hernia is merely an artificial hastening of the process in men who have a natural tendency to suffer from hernia.

*Artificial Tumours.*—The injection of paraffin in order to form an artificial tumour has been largely employed in Russia. In several cases the injection was made into the scrotum, in others into the muscles of the leg; the real nature of the tumour was exposed by placing a hot bottle on it when its consistence speedily became soft and pliable. In one case a soldier was admitted to hospital with suppuration of the right inguinal glands; a small piece of paraffin was found in the dressings covering the sinus; this led to the recognition of the real condition. In this case the operator had neglected the usual antiseptic precautions.

*Jaundice Produced by Picric Acid.*—The ingestion of picric acid produces a yellow discolouration of the skin and mucous membranes which closely simulates true jaundice. The dose required to produce the appearance of jaundice varies between 0.3 and 0.9 gramme; the staining is apparent in about six to ten hours and persists for six to sixteen days. The pulse-rate is increased and the digestion upset by these doses. The urine shows a ruby red colour, and the presence of picric acid can be detected by chemical reagents. The stools remain normal. In one case the patient was found in possession of gelatine capsules containing 0.3 gramme of picric acid.

C. E. P.

**Improvised Blanket Stretcher for Mounted Troops.**—In the *Militär-Wochenblatt* of April 30th, 1910, Oberstabsarzt Blau describes his "Sattelzeugtrage" a modification of Petsche's blanket stretcher. He gives the following directions:—

(1) Four men are ordered to unscrew the balls on the tops of their helmets or to take off their sword-knots.

(2) Swords-knots are to be double-knotted and the tassel passed through the remaining loop to form a firm ball.

(3) The blanket is next taken from the wounded man's horse, or from a horse which has been killed.

(4) Four stirrups with stirrup leathers are taken if possible from the off artillery horses.

(5) At each of the four corners of the blanket is placed a helmet ball or knotted sword-knot; the stirrups with leathers are placed alongside with the foot-piece of the stirrup directed towards the blanket.

(6) A loop of the blanket is next pulled through the opening in the foot-piece of the stirrup.

(7) The helmet ball or knotted sword-knot is pushed into the loop of blanket.

(8) The blanket is now pulled back again through the opening of the foot-piece in the stirrup and at the same time so arranged as to form a firmly fitting cap for the helmet ball or knotted sword-knot.

(9) The helmet ball will now be found to give a firm hold on the blanket, and it is not liable to slip.

(10) All the four stirrup grips to be thoroughly tested by pulling.

This improvised stretcher should be prepared in five minutes; for a short distance it may be carried by the stirrup irons alone; it is preferable, however, to let out the stirrup leathers to their full length and use them as slings, as they are sufficiently long to be placed over the opposite shoulder. By using the stirrup leathers as slings, two bearers (instead of four), one at either end can carry a patient; the slings can also be used for suspending the patient in an ambulance wagon. With four bearers using the slings one can take either end, and by fixing two more stirrup leathers in the middle of the sides of the blanket, the other two can support the body of the patient and prevent the blanket from sagging; if the fifth and sixth stirrups are not available the third and fourth bearers can cross hands under the blanket and in this way materially assist in carrying the patient.

C. E. P.

**Removal of Wounded from the Battlefield.**—In the *Journal des Sciences Militaires*, of January 15th, 1910, Dr. Berthier has published a lecture delivered at the course of instruction at Montauban, on the subject of removing wounded from the battlefields. Much of the lecture refers to the French army medical regulations, but the following points are of general interest :—

In modern battles the combatants are all under cover and therefore invisible, the battlefield appearing to be deserted. At intervals the ground is swept by a hail of shell; when advancing the infantry makes sudden rushes, immediately becoming invisible under cover, from which it delivers a withering fire. One cannot and should not attempt to remain standing in or near the fighting line; obviously the medical service must also conform to the exigencies of the situation. Under these conditions any attempt to remove wounded must result in failure, for stretcher bearers promenading about the battlefield would prove an excellent target for the enemy and be slaughtered, along with the wounded man.

During fighting everyone must try to remain invisible; no General would permit stretcher bearers to come up to the fighting line, and so reveal the location of his troops to the enemy.

When hit, a man instinctively tries to crawl to the nearest shelter and

so avoid getting hit a second time. He will find some kind of cover behind a tree, in a ditch, or hollow in the ground, and in this way "nests" of wounded are gradually formed. Those able to walk will make their own way to the rear, sometimes for a considerable distance; some make for the dressing station, some for the field ambulance, while many take refuge in neighbouring villages. In the Russo-Japanese campaign a considerable number of these men were hit a second time while leaving the fighting line. During the battle of Sandipou, January 27th, 1905, some Russian ambulance wagons tried to get up to the front. They were immediately surrounded by crowds of wounded men, this attracted the Japanese artillery fire, with the result that many of the men were killed and the wagons destroyed.

A lull in the firing may be due to one of several causes — *e.g.*, shortage of ammunition, the men being exhausted, or that the enemy is no longer visible and does not therefore present a target. In the latter case should the stretcher bearers attempt to remove the wounded they would naturally become a target for the enemy; we are therefore obliged to wait for night before commencing the removal of the wounded from the field. Before nightfall the senior medical officer should divide the fighting line into areas, and allot these to groups of bearers, who, as soon as night falls must begin a systematic search of the ground and carry the wounded to the nearest road along which the ambulance wagons can approach and receive them. The great principle is to reduce as far as possible the distance which must be covered by hand carriage. Light ambulance wagons might in favourable country come right up to the groups of wounded. As regards first-aid treatment the two most important things are to cover the wound, thus preventing the entrance of septic matter, and the application of splints to fractures. To carry out such treatment without having to delay till a favourable opportunity occurs, Berthier suggests that half of the regimental stretcher bearers should leave their stretchers at the regimental "*poste de secours*," and remain in the fighting line. They can entrench themselves or take cover like their comrades, and they can apply the wounded man's own first field dressing; if supplied with a surgical haversack they could apply a tourniquet or splints as required, as well as assisting the man to gain some cover. They, in fact, would become for the time being dressers to the regimental surgeon.

As regards evacuation from the dressing station every kind of conveyance will have to be used. The new French regulations have added thirty wheeled stretchers to each infantry divisional field ambulance; fifteen of these are carried on a supply wagon. During the last French army manoeuvres of the South-West, patients, many of whom were seriously ill, were successfully transferred, merely lying on straw on the floor of the motor trucks of the supply column from the manoeuvre area to Bordeaux, a distance of some 60 miles. In spite of bad roads a speed of 15 miles an hour was maintained. The patients complained of being shaken, and it would appear advisable to have some kind of framework for carrying stretchers. Dr. Berthier recommends that all heavy ambulance wagons should be replaced by motor-ambulance carriages, as this would enormously increase the rapidity of evacuation.

He advises the retention of the light two-wheeled ambulance wagon,

carrying two lying down and two sitting up, as it is capable of being used over bad roads or even across country.

Dr. Berthier strongly approves of the ambulance dog, and would have two of these attached to each infantry field ambulance. He also advocates the plan of supplying each soldier with a whistle, by means of which, when wounded, he can attract the bearer's attention. Matignon has designed an identity disc which is also a whistle.

Dr. Berthier condemns all plans of lighting the field by powerful illuminants, when searching for wounded, as certain to attract the enemy's fire. He has designed an acetylene lamp in which the flame is covered by a hood. The area illuminated varies from 10 to 50 yards, according to the height at which the lamp is held; the light is absolutely invisible at a distance of 300 to 400 yards. When circumstances permit of it the hood can be taken off and the full light used—*e.g.*, in an operating tent at a distance from the fighting line. The lamp, when full, weighs 4 kilograms (8½ lb.), and burns for six to seven hours without being recharged.

The removal of wounded by night presents many difficulties, even when aided by artificial light. The bearers must be trained to working at night as objects look quite different; sounds being heard at much greater distances, bearers must learn to work in silence; they must learn to recognise the path by which they came, to note the landmarks—*e.g.*, trees, brooks, fences. On clear nights the Pole star may serve as a guide. Night work, by preventing sleep, soon exhausts the *personnel*.

C. E. P.

**Issue of a Wine Ration in the French Army.**—Circular No. 77 of the Direction du Service de Santé, which is published in the *Bulletin officiel*, No. 52, of 1909, contains instructions on the use of tea and fermented liquors in the French Army. According to the directions at present in force, an issue of tea, to be drunk at meals, is authorised on the appearance of any epidemic. The great value of tea consists in the fact that the water must be boiled and therefore sterilised. It is, however, recognised that drinking tea at meals does not suit the French taste or customs of the country. The circular therefore recommends that the tea should be partaken of between meals, and that a ration of about 8 oz. of wine or its equivalent in some form of fermented liquor should be allowed at each of the principal meals. The opinion is expressed that a moderate quantity of fermented liquor taken with a meal can only produce a good result, and that it has in fact a soothing influence, stimulating the nervous system and increasing the man's resisting power while diminishing fatigue.

Advantage should be taken of these valuable properties as often as possible, and not only when an epidemic is feared or has begun. Up to the present wine has only been allowed as an issue to the troops on special occasions. In future the wine ration is likely to be issued pretty regularly for the whole army, as it already is in some of the corps.

An issue of fermented liquor in moderate quantities really improves the soldier's diet, and the men in charge of messing should remember this when expending the mess funds.

Officers in command are asked to watch the application of the above principles.

C. E. P.

**Wounds in the Russo-Japanese War.**—The *Militärarzt* of June 11th, 1909, contains a précis of an article by Osten-Sacken in the *Wogenno-med. shurn.* of June, 1908. According to this writer the losses by wounds in general, and in the individual battles, was only about 3 per cent. of the strength engaged. Individual units, however, suffered severely: thus the 6th Siberian Rifle Division at the Battle of Mukden lost 31 per cent.; the 3rd Siberian Rifle Regiment at Sandipou lost 66 per cent. (95 per cent. of its officers); the 4th Regiment 53 per cent. (88 per cent. of officers). The proportion of killed to wounded was 1 to 5.5.

The heaviest losses (about 46 per cent.) occurred at ranges of about 500 paces, and next to this at 500 to 1,000 paces (about 28 per cent. of all wounds).

Artillery fire has become more effective. Of a total number of 10,055 casualties about 22 per cent. were shell wounds; many of these were skin wounds and bruises.

About 30 per cent. of the total number of wounded were able to rejoin their units at the front. There was no appreciable difference in the character of the wounds inflicted by the Japanese Murata rifle of 8 mm. calibre and 1,881 feet initial velocity, and the Arisaka rifle, calibre 6.5 mm. and 2,451 feet per second initial velocity.

C. E. P.

**Ambulance Dogs in France.**—The *Caducée* of January 8th, 1910, contains an interesting report of some further trials carried out in the forest of Fontainebleau by the Ambulance Dog National Society. Four dogs were tested — viz., three German sheep dogs trained to bring back some article belonging to the wounded man, and one "aboyeur" trained to remain by the wounded man and bark till assistance arrived. The following conclusions were formed:—

(1) The sheep dog is the most suitable, being hardy, intelligent, and docile. Sporting dogs are too much inclined to give up the search for wounded and hunt for game if any is about.

(2) The dog trained to bark is only of use by day, as in the dark it is difficult to locate the place where it is barking, and if several of these dogs were employed hopeless confusion would result. The barking would also alarm the outposts and probably disturb the troops' repose.

(3) A dog trained to work silently, find the wounded man, and without making a sound to return to its master, is the ideal ambulance dog.

(4) Dogs work better by night than by day, as there is less to distract their attention. It may be remarked that the collection of wounded will frequently have to be undertaken by night.

(5) The stretcher bearer who is being guided to a wounded man by a dog must not carry a bright light, as this only interferes with the dog.

C. E. P.

## Correspondence.

### HINTS ON STAFF RIDES.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—As Major Mould invites criticism of his useful and interesting article on "Staff Tours" in the July number of the JOURNAL, I venture to point out an error very common not only among Staff officers but also amongst officers of our Corps.

Under the head of "Duties of the Officer Commanding Field Ambulance," Major Mould states one of these to be the selection of sites for "collecting" and dressing stations.

This "collecting station" is constantly being confused with the collecting station of the old organisation of "Bearer Company and Field Hospital," and which was a post for collecting the wounded situated in advance of the dressing station. This "collecting station" still exists in the field medical organisation in India, where the field ambulance system has not been adopted.

Now, under the new organisation the "collecting station is a well-defined spot previously notified for the purpose by the Administrative Medical Officer of the division," and to which the regimental medical establishment will direct cases able to walk (*vide* section 75, para. 2, ii, Field Service Regulations, part ii).

This collecting station is the "link" between the field ambulances and the clearing hospital referred to in section 77, para. 11 (p. 103), of the same book.

The *personnel*, equipment, and transport for this link are apparently furnished by one tent sub-division or more from a reserve field ambulance.

What we have, however, to bear in mind is that the collecting station has nothing to do with the field ambulance, and that it is a well-defined spot under the control of, and selected by, the Administrative Medical Officer of the division. It is situated in rear of the field ambulances, and between them and the clearing hospital. To this spot cases able to walk would find their way, and would not pass through the field ambulance at all.

One book which I think Major Mould did not include in his list of books recommended is "Royal Army Medical Corps Training." The organization of a field ambulance is very clearly and concisely described in part ii. under the head of "Field Training." No mention of the collecting station will be found there, as it forms no part of the field ambulance.

I am, &c.

Binegar Camp, Somerset,  
July 25th, 1910.

W. TIBBITS,  
Major, R.A.M.C.

## INDIAN MEDICAL GAZETTE.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—The July number of Volume VIII. of the *Indian Medical Gazette* is wanted to complete the series in the Library of the Royal Army Medical College. It has been ascertained that this number is "out of print," and the Library and Journal Committee of the Royal Army Medical Corps would be glad if any officer, possessing a spare copy of this volume, would present it to the Library.

The copy should be forwarded to me at the War Office.

I am, &c.,

War Office,  
July 22nd, 1910.

B. H. SCOTT,  
Major R.A.M.C.,  
Hon. Sec., Library and Journal Committee.

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Journal  
of the  
Royal Army Medical Corps.

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Original Communications.

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FLORENCE NIGHTINGALE, O.M., R.R.C.

BY MAJOR C. E. POLLOCK,  
*Royal Army Medical Corps.*

IN this article I propose to give an account, not so much of the life of Florence Nightingale as of her work in connection with the military hospitals in the East in 1854-55.

Florence Nightingale was born at Florence in 1820. From an early age she took a deep interest in nursing and all questions concerning the alleviation of suffering.

Fortunately her father determined to give her a liberal education very much in advance of what ladies usually received at that time; so that when called to perform the great work of her life she was, thanks to this thorough mental training, enabled to make full use of her genius for organisation. When her education was finished she began a systematic study of nursing as it was then practised, and for this purpose visited the hospitals of London, Dublin, and Edinburgh, a novel and somewhat heroic undertaking for a lady in those days. In 1849 she worked for several months as a voluntary nurse with the Protestant deaconesses of Pastor Fliedner's institution at Kaiserwerth. She next made a prolonged visit to the Sisters of St. Vincent de Paul in Paris and became thoroughly acquainted with their work and methods. On returning to England she undertook the management of the Home for Sick Governesses in Harley Street. This work she carried on assiduously for several years, till her health broke down and she was obliged to retire to the country for a prolonged rest.

It was at this time that Dr. Howard William Russell's descriptions of the appalling state of the military hospitals in the East began to be published in the *Times*. It would serve no useful purpose to attempt any description of the actual state of affairs then prevailing in the hospitals at the front, full details of which will be found in "The Report from the Select Committee on the Army before Sebastopol, 1855." We may merely point out that nearly forty years of peace, coupled with rigorous economy in every branch of the Army, had resulted in a total want of preparedness for war both as regards provision of stores and the training of *personnel*.

The military hospitals at Scutari were placed under the command of a major while practically everything except actual medical attendance and drugs was supplied and supervised by the medical purveyor, who at first did not recognise the Principal Medical Officer as his superior. The medical purveyor's establishment sent out for the hospitals at Scutari consisted of one ailing ex-clerk, aged 70, two assistants, and three boy clerks. This staff was expected to arrange for the food, cooking, clothing, bedding, washing—in fact, all the requirements of the hospitals at Scutari, which by the beginning of November, 1854, contained some 2,800 patients.

When war was declared there were no men of the Army Hospital Corps available for duty in the military hospitals in the East; to meet this want pensioners were hastily enlisted as attendants for the sick. Female nursing, even in civil hospitals, was crude and performed by untrained ignorant women of the lowest class, and at that time no one had the temerity to suggest that women nurses should be employed in military hospitals.

Under these circumstances, which were well known, Florence Nightingale volunteered to undertake the organisation and superintendence of the nursing in all the military hospitals in the East.

Having determined to accept Miss Nightingale's offer, Mr. Sidney Herbert did all in his power to make her mission a success, as may be seen from the instructions which he issued to her and which we reprint below.

#### NURSES, SCUTARI HOSPITAL.

The following memorandum was drawn up by Mr. Ramsay at Mr. Herbert's desire when the Government had determined upon sending out an establishment of nurses for the purpose of rendering service to the sick and wounded in the Military Hospital at Scutari:—

“The following arrangement has been made between the Secretary at War and Miss Nightingale for the conduct of the female nursing in the English Military Hospital in Turkey.

“It being impossible to admit into a military hospital any persons offering themselves whether known to be capable or not, and most important that all should act in due subordination to one recognised head, Miss Nightingale will undertake the entire management of the female nurses under the control of the Chief Medical Officer at Scutari. The nurses will be selected by her, or by persons whom she may appoint, and all will act under her supreme authority.

“Miss Nightingale will go out forthwith, taking with her any nurses she may be now able to select. These nurses will receive, on her recommendation, certificates signed by the Director-General of the Army and Ordnance Medical Department, on the production of which they will be admitted into the hospital; no nurse being admitted without it. Other nurses will be selected by persons in whom Miss Nightingale reposes confidence, and will on their recommendation receive certificates, and be forwarded to her from time to time in such number as she finds necessary; these nurses will be selected without any reference to creed, but solely to fitness for the work to be undertaken. The Government will defray all the expenses of the passage out and home, the subsistence and the expense generally, including wages, and of the nursing establishment.

“The Government will give immediate orders for a house or houses to be engaged at Scutari, where Miss Nightingale and the nurses under her will lodge, or, if more convenient, quarters will be found for them in the barracks. Miss Nightingale will make such arrangements as she thinks necessary for the amount of pay to be received by the persons employed under her, and she will also arrange with the Principal Medical Officer what sum should be given to each person in lieu of subsistence. For all current expenses, such as house rent, subsistence wages, &c., Miss Nightingale will apply, through the Principal Medical Officer, to the Purveyor-in-Chief, and she will also render to this office an account of all monies received from him.

“The General Agent has been instructed to honour Miss Nightingale's drafts to the amount of £1,000, and for which sum she will account to the Purveyor of the Forces at Scutari.

“Miss Nightingale has undertaken this arduous and responsible duty voluntarily and gratuitously, and the Secretary at War trusts

that she may meet with that co-operation from those in authority, without which the noble work she has undertaken cannot be successful."

Copies of these instructions were sent to the General Officer Commanding the army at the front, the Purveyor-in-Chief, and the Principal Medical Officer.

Miss Nightingale hastily collected a band of thirty-eight sisters, nuns, and paid nurses. Each paid nurse had to sign an agreement binding herself to serve for one year unless sent home on account of sickness or inefficiency; the "wages" were fixed by the superintendent at 10 to 18 shillings a week, according to merit. Florence Nightingale and her party arrived at Scutari almost at the same time as Mr. J. C. Macdonald, the administrator of the *Times* Relief Fund. He brought out with him a certain quantity of clothing, equipment, and medical comforts, and had money to purchase in the local bazaars things urgently required. This invaluable assistance afforded immediate relief in regard to the most pressing necessities.

Under Miss Nightingale's organising genius the state of the military hospitals rapidly improved. That her work was by no means easy, and demanded not only continuous and earnest application but also much tact, is evident from her letters and the answers of certain of the witnesses examined by the "Select Committee on the Army before Sebastopol."

Some of the nurses do not seem to have shared Miss Nightingale's views as to the duties which they ought to perform. She accordingly drafted out in her own handwriting a set of "rules and regulations" clearly defining the work which would be expected of every nurse; these she sent to Mr. Sidney Herbert, who had them printed and handed to every candidate for appointment as nurse in any of the military hospitals at the front. We reproduce them here:—

**"RULES AND REGULATIONS FOR THE NURSES ATTACHED TO THE  
MILITARY HOSPITALS IN THE EAST.**

"As it has been stated that the nurses who have gone to the hospitals in the East have in some instances complained of being subject to hardships and to rules for which they were not previously prepared, and of having to do work differing from what they expected, it has been thought desirable to state distinctly the regulations relative to the outfit, clothing, duties, and position of nurses in military hospitals.

“ I.—*Clothing.*

[A list of the articles of clothing to be supplied gratis by Government, as also of those to be maintained by the nurse, is given.]

“ II. .

“ The nurses are required to appear at all times in the regulation dress with the badge, and never to wear flowers in their bonnet-caps, or ribbons, other than such as are provided for them, or are sanctioned by the superintendent.

“ III.

“ Nurses dismissed for misconduct will forfeit so much of their regulation clothing as consists of gowns, cloaks, and badges ; all of which will be given in charge to the superintendent.

“ IV.—*Wages and Allowances.*

“ Every nurse will receive wages, to be raised, according to merit, at the end of three months, six months, and one year, unless the superintendent state reasons to the contrary ; the rate of wages to be as stipulated in the form of agreement signed at the time of the nurse's appointment. The nurses shall receive their wages quarterly, and only through the superintendent.

“ V.

“ All nurses will be provided with board, lodging, washing, and travelling expenses to and from the hospitals ; if compelled to return to England from ill-health, certified by two medical men, they will receive wages up to the day of their arrival in England, and they will be entitled to two months' wages on discharge at the rate at which they were receiving them when they fell sick.

“ VI.

“ Nurses discharged for misconduct will be paid only to the day of their discharge, and will be sent home as third-class passengers.

“ VII.

“ No nurse discharged for misconduct of any kind can be engaged again for the Government Service.

“ VIII.

“ If any nurse be found intoxicated she will at once be discharged, and her pay will immediately cease.

## "IX.

"Each nurse will be allowed 1 pint of porter or ale at dinner; half a pint of porter, or a wine-glass of wine, or 1 oz. of brandy (as she likes best) for supper. In case of constant attendance on cholera or infectious fever, the superintendent may allow an extra quantity at her discretion.

"X.—*Duties.*

"Each nurse must engage not only to do any kind of nursing work, but also (whenever the superintendent may think that from the number or state of the patients her services are not required for nursing) to do needlework for the hospital; to cook; to assist in the cleaning of her own and the ladies' apartments; to wash and iron her own clothes; and generally to discharge such other household duties as the superintendent may require.

## "XI.

"No nurse will be allowed to walk out except with the house-keeper, or with a party of at least three nurses together, and never without leave previously obtained.

## "XII.

"Each nurse must engage to remain attached to the hospitals at least one year, unless compelled by illness to return home. She must also undertake to serve in any of the hospitals of the Army in the East when required.

## "XIII.

"Each nurse must engage not to receive presents of any kind from any patient, rich or poor; and under no pretence whatever to accept any spirits, wine, or beer from any person, except as provided in Art. IX., on pain of immediate dismissal.

## "XIV.

"It having been found that some of the nurses have believed they were to be on an equality with the ladies or sisters, it is necessary they should understand that they will remain in exactly the same relative position as that in which they were in England, and under the authority and direction of the lady superintendent or the persons acting under her.

## "XV.

"All will be required to rise early, to be punctual at meals, to conform to the rules from time to time laid down and sanctioned by the proper authorities, and to show great forbearance one towards another.

## "XVI.

"Each nurse will be required to sign an engagement binding herself to obey these rules and regulations.

"N.B.—These regulations (so far as they are applicable) will extend to all female servants employed under the superintendent of each hospital."

These are probably the earliest rules defining the position and duties of a female nurse in any military hospital.

Some friction appears to have occurred on the subject of the difference in religion between certain of the nuns and the patients. Florence Nightingale was determined that this should cease, and her letters show that she endeavoured to provide nurses of the same religion as their patients.

The following letters give an excellent review of the question of employing female nursing in military hospitals, and also show what a complete grasp Miss Nightingale had obtained of the whole subject after little more than six months' experience.

"BARRACK HOSPITAL,

"SCUTARI,

"May 1, 1855.

"DEAR SIR,—With regard to the general Nurse-question in the East, it is divided into a three-fold system:—

"Viz., mine of ladies, nuns, nurses—the latter in a large majority;

"That of Smyrna, the same, with omission of nuns and augmentation of ladies;

"That of Koulale, consisting of Nuns, Ladies, and Nurses, the paid nurses being in smaller proportion to the whole.

"(I.) I maintain the opinion that for Military Hospitals under present circumstances, where a large number of convalescents, unfit as yet for duty, must always be mixed up with the patients, the whole number of female nurses should be small. Reckoning about three or even two and a half per hundred of *really* sick—and allowing one-third of the whole number of patients to be convalescent (and the proportion is now, happily, nearer two-thirds—out of 1,100 patients here, we have not 100 in bed), this will give 25-30 nurses for 1,500 patients, allowing 500 to be convalescent.

"(II.) That the chief element should be paid nurses.

"(III.) That, as there are so many Roman Catholic soldiers, there should be Roman Catholic sisters (as also there *may* be Protestant sisters). And as there are Scotch soldiers there should

be Scotch nurses. But all should be chosen as qualified nurses, whether sisters or not, and, as far as may be, *practically experienced*.

"Great waste of money, of health, and many other inconveniences have followed want of care in selection, and, I may add, want of special knowledge in the selectors, as well as want of assiduity in testing recommendations.

"As to the Smyrna plan, I fear that the large proportion of ladies and the formation of two distinct classes (one inferior to the other) may not succeed. Ladies are with difficulty to be found whose qualities, experience, and health fit them for the task.

"It may be feared that more may be attempted for the solace and indulgence of the soldiers than can be carried out or be advisable, considering his discipline, his past, and future career. But with a civil medical staff it may be more easy than with the military medical staff.

"As to Koulale, it will, I fear, be found that, however well managed the female department may be, the numbers are greater than the requirements, and that the military medical staff may not like the interference of the female nursing element to so great an extent as it must be there employed.

"As Miss Stanley had the entire interior management of Koulale, I cannot say how she specially arranged the Roman Catholic sisters. The sickness disarranged everything, and now that this is abated, and the whole number of sisters and nurses made up to about 43 for 500 patients (the present number), the application will be tested. The capacity of that hospital (or rather the three adjacent ones at Koulale) will be about 1,600.

"Dr. Parkes has told me that he has positive instructions to erect huts for 1,000 patients (see memo.). He wishes for 40 females to attend upon these, and I hear that 100 are coming.

"Having great fears for the result of his difficulties, and knowing that hospitals have been erected for 1,000 at Balaclava and augmented at Koulale by 500, and at Smyrna by 500, since Smyrna was fixed upon (see memo.), and that the sick have diminished to

In Barrack Hospital, Scutari	..	..	..	..	1,100
General	"	"	"	"	450
Palace	"	"	"	"	250
Smyrna	..	..	..	..	450
Koulale	..	..	..	..	500

2,750

(leaving room at Koulale, Scutari, and Smyrna for 1,800 to 2,000),

I would deprecate a *positive order*, and ask that Dr. Parkes may have *permission* to erect huts for 500 sick only, *if he sees fit*.

"Secondly, as to the females, that they should by no means exceed 40 for these 500 (a far larger proportion than I think necessary) and that no more than 20 should come at first.

"Without entering into discussion as to the principles of female nursing and the proportions of the *classes* of females, it is obvious that, as *far* the greater part are wholly undisciplined, *numbers* make arrangement and management more difficult. Forty women, living closely packed in narrow quarters under new discipline and in a barrack—women, too, whose tempers and habits are unknown—present *great obstacles to management*. Those who send them should well consider what are the circumstances, and what the cost and hardship of sending *women* home who may not suit the work, and what the consequent result of working with *bad tools*.

"The latent opposition of the army surgeon can only be augmented and stimulated, if he be annoyed by too great numbers, by inefficient people (as to nursing) and by indefinite rules, and both the female superintendent and the medical chief of the hospitals may be employed in soothing acerbities and smoothing difficulties which might have been wholly avoided.

"What I fear is this (of which there are already incipient indications)—*viz.*, that the whole system of female nursing in military hospitals may be brought into ridicule and disrepute, if it be not restricted in the numbers placed together and be not guarded by definite rules under these new circumstances as existing at this date—*viz.*, May 1.

"Believe me, dear Sir,

"Yours truly,

"FLORENCE NIGHTINGALE.

"B. Hawes, Esq., M.P.,

"*Secretary, &c., &c.*

"Memo.—According to the French proportion of extra numbers, to 1,000 sick there would be 250 :—

100 soldiers.  
50 orderlies.  
50 nurses.  
50 cooks, porters, &c.

"Increase (after decision on Smyrna) of hospital room :—

Smyrna {	Huts promised ..	200	Koulale {	New buildings,	
	Lazaret for convalescents ..	300		800—less	300 disused buildings.
		<hr/> 500			<hr/> 500

“BALAKLAVA,

“May 10, 1855.

“DEAR SIR,—Having now had an opportunity of examining myself into the condition of the sick and wounded here, and hearing the opinions of the medical officers here, I hope you will allow me to trouble you with a few words about female nurses.

“I arrived here a week ago with three of my Scutari nurses (as we had then every probability of having wounded immediately) in order to reinforce the eight nurses whom I had previously sent here to serve in the general hospital now containing about 200 sick, and recently, in the Castle Hospital or Sanitarium, now containing about 110 wounded and 80 sick. The prospect of wounded is now indefinitely postponed. But, even in the case of any great and sudden emergency there would be no lack of nurses, as I could spare any number from Scutari, for whom accommodation, in wooden huts or otherwise, could be made here—at least 20 could be spared, 50 being my present number at Scutari and Balaklava, of whom I have at this moment—

39 at Scutari.

11 at Balaklava.

50

“It has been now announced as Lord Raglan’s intention to keep his wounded, should there be unfortunately such, in the Crimea, and to provide accommodation for them here, to the extent of about 2,500<sup>1</sup>

“I would earnestly deprecate the sending out of any more ‘female troops’ at present—for any of the existing hospitals. I would point out that the number is far too large under existing circumstances, the proportion of convalescents being, I am thankful to say, in every hospital from one-third to nine-tenths. The attendance of females upon convalescents is obviously objectionable. I could work the Scutari hospitals *at present* better with twenty than with forty nurses, and I am informed by the Principal Medical Officer of Balaklava that he considers ten to twelve nurses here, at present, amply sufficient; I have, therefore, a reserve of twenty for a battle or an assault, whom I could bring up from Scutari at any moment. The health of the Army is admirable. We have a few cases of fever only, a few of cholera.

<sup>1</sup> To the extent of viz., 700 sanitarium, 200 general hospital, 620 transports, 1,060-1,590 regimental huts besides the huts about to be erected at Monastery St. George.

"To place women in the regimental hospitals could, of course, never be contemplated or permitted.

"But as there has been much irresponsible action in this matter of sending out female nurses to the Army—action, too, upon *partial* information—I have thought it desirable to express strongly to you an opinion founded upon present circumstances and supported by all the Army Medical Officers.

"I remain, Sir,

"Your obedt. Servt.,

"FLORENCE NIGHTINGALE.

"B. Hawes, Esq., M.P.,

"*Secretary.*"

More fortunate than many other great public benefactors, Florence Nightingale was permitted to see the fruits of her teaching in the establishment of numerous training schools for nurses, and the elevation of nursing from an occupation followed by elderly women of no education into a scientific profession under the patronage of the highest ladies in the land.

It may not be generally known that the red uniform cape worn by the ladies of the Queen Alexandra's Imperial Military Nursing Service is modelled on that originally introduced by Florence Nightingale for the nurses whom she took with her to Scutari. This cape may therefore be regarded as a memorial to the great founder of military nursing.

## MEDICAL HISTORY OF THE SOUTH AFRICAN WAR.

BY LIEUTENANT-COLONEL R. J. S. SIMPSON, C.M.G.  
*Royal Army Medical Corps.*

*(Continued from p. 275.)*

(15) *Comparative Prevalence and Mortality by Groups.*—(a)

The army in South Africa was composed of two bodies of men whose disease history differed very much—the Colonial troops and rest. As regards the former, we may assume without serious error that no very marked difference existed between the different components of the whole group in their previous exposure to epidemic disease. The remainder, on the other hand, consisted of two groups, the Regulars and Volunteers, and the Imperial Yeomanry, of whom the latter had been less exposed than the the former. Among the Regulars and Volunteers, the number of men from India (with a higher degree of protection) was about the same as the number of volunteers from England (with a very low degree of protection), so that the average condition in the whole group was not seriously disturbed by the inclusion of these two groups, varying in themselves from the average. A large proportion of the reinforcements had very little protection previous to their arrival, but as the War progressed an increasing proportion were protected by attack in South Africa, so that the group as a whole had some degree of protection. In the Imperial Yeomanry, on the other hand, there was for nearly the whole of the force no previous exposure, nor (from the relief of one contingent by another) the same tendency to increase of protection as the War went on; that is, experience would lead one to believe that, on the whole, Colonial troops were less likely to suffer from a high incidence of enteric fever, but on the other hand were more likely to be affected with some degree of chronic dysenteric infection, and that the Imperial Yeomanry were more likely to suffer from a high incidence of enteric fever and less likely to show any antecedent dysenteric infection than the Regulars and Volunteers.

(b) In each of these groups we have the two classes—officers and men. The characteristics mentioned above apply more especially to the rank and file; the relations of the officers of the different groups vary somewhat from these.

At the beginning of the War the officers of the Regulars showed the normal age distribution—i.e., a preponderance of the younger

men of shorter service. Owing to the shortage of officers this normal preponderance became more marked as time went on and the vacancies were filled up by very young officers, many of whom joined their units in South Africa, direct from the military colleges or the Militia. Their degree of protection cannot have differed materially from that of the men of the drafts. The officers of the Imperial Yeomanry, on their first arrival in South Africa, included a comparatively large number of those who had already served in the regular forces or elsewhere abroad, and though the proportion of young officers was considerable (probably not as great as in the Regulars and Volunteers), vacancies in the later contingents were filled up to a considerable extent by promotion of those who had served in the ranks in South Africa in an earlier contingent and had been exposed to infection. They were probably better protected than their men. The officers of the Colonial troops again were still more likely to be protected by previous infection, probably at least as much as their men.

These are the rough outlines of the probable conditions as regards previous exposure, attack, and protection in the various groups. (The effect of the limited inoculation that was carried out has been neglected entirely at this point.) It is interesting to see how far these are reflected in the tables of incidence, mortality, and case mortality for the epidemic diseases for the several groups.

(c) It has been shown (p. 26, vol. i., 1910) that a correction of the total *recorded* admissions and deaths was necessary owing to the fact that our recorded deaths for disease among the men showed a loss of 18.98 per cent. In preparing the more detailed tables which follow, relating to the various groups, similar corrections have been made; the loss, however, is not the same in each of the groups, but as shown below:—

		per cent.		per cent.		per cent.					
Officers	..	Regs. and Vols.,	14.1	..	Imp. Yeo.,	16.6	..	Colonials,	15.6		
Men	..	"	"	18.7	..	"	"	19.4	..	"	20.8

The numbers recorded have been corrected in these proportions and used to calculate the incidence and mortality per 1,000 of strength, but the case mortality has been calculated from the recorded admissions and deaths, and has, therefore, a higher degree of accuracy.

(d) It appears to be possible to answer the following questions from a consideration of the ratios given in these tables, within the limits of error of the figures:—

(i.) Is there evidence of the protective effect of previous exposure and attack *even under war conditions*?

(ii.) Is the incidence, mortality, and case mortality the same among officers and men?

(iii.) Are enteric fever and dysentery alike in these relations?

For easier comparison the detailed numerical results may be summarised as shown below. Where there is no significant difference a blank is shown. Instead of inserting the actual numerical ratios, the proportion of the rate among officers to that among the men, and similarly in the other groups compared, is given in order to facilitate comparison, but it must be distinctly understood first that the individual differences are frequently very small, though the ratio of the two is large, and secondly, that these ratios are subjected to errors, often comparatively large. These errors are, however, given in the larger tables, and may be referred to in case of doubt :—

COMPARISON OF RESULTS.							
Incidence				Mortality		Case Mortality	
Enteric alone—							
Officers	R. & V.	106	Men 100	Officers	70	Men 100	Officers 66
	I. Y.	63	100		57	100	Men 100
	R. V. & I. Y.	—	—		70	100	68
	Colonials	78	100		75	100	—
	Total	95	100		68	100	71
All Continued Fevers—							
Officers	R. & V.	105	100				
	I. Y.	72	100				
	R. V. & I. Y.	—	—				
	Colonials	78	100				
	Total	97	100		As above		As above
<i>Regulars and Volunteers — Imperial Yeomanry.</i>							
Enteric alone—							
Officers	R. & V.	118	I. Y. 100	R. & V.	—	I. Y. —	R. & V. —
Men		70	100		74	100	I. Y. —
All Continued Fevers—							
Officers	R. & V.	115	I. Y. 100				
Men		79	100		As above		As above
<i>Regulars, Volunteers, and Imperial Yeomanry. — Colonials.</i>							
Enteric alone—							
Officers	R. V. & I. Y.	198	Col. 100	R. V. & I. Y.	176	Col. 100	R. V. & I. Y. —
Men		153	100		190	100	Col. —
All Continued Fevers—							
Officers	R. V. & I. Y.	208	Col. 100		As above		As above
Men		160	100				

Taking the three questions in order :—

(i.) There appears to be undoubted evidence of the protective effect of previous exposure and attack, even under war conditions.

(a) The officers and men of the Regulars, Volunteers, and Imperial Yeomanry taken together show a much higher incidence and mortality, and the men a higher case mortality than the corresponding classes of Colonial troops.

(b) The officers of Regulars and Volunteers show a higher incidence rate than the officers of Imperial Yeomanry. The men of Regulars and Volunteers show a lesser incidence and mortality than the men of Imperial Yeomanry.

(c) The officers of Regulars and Volunteers show a higher incidence rate than the men of the same group. The difference is not great but is quite distinct.

These results also hold good if the total of the continued fevers be used instead of enteric fever alone.

(ii.) The officers of the Regulars, Volunteers, and Imperial Yeomanry taken together show an equal incidence and lesser mortality, and a smaller case mortality than the men. (The only exception under this head is the greater incidence among officers of Regulars and Volunteers than among the men). The Colonial troops follow the same rule, but the difference is less marked than in the Regulars, Volunteers, and Imperial Yeomanry, and the case mortality is indistinguishable between officers and men.

Possible reasons for this distinction have already been considered in relation to the comparative results in Bloemfontein. If we take the mortality rates in order of magnitude, as below, some additional light is thrown on the subject:—

#### MORTALITY SERIES. ENTERIC FEVER.

Men	Imperial Yeomanry	.. 26.07 per 1,000	These do not differ significantly; the differences between the other pairs are all significant.
	Regs. and Vols	.. 19.37	
Officers	Imperial Yeomanry	.. 14.75	
	Regs. and Vols.	.. 13.59	
Men	Colonials	.. 10.36	
Officers	Colonials	.. 7.81	

Now men of the Colonial troops showed a lesser mortality than any other group except their own officers (about half that in the Regulars and Volunteers), and again, as far as the figures go, the officers of the Imperial Yeomanry showed a mortality which is not distinguishable from that of the men of the Regulars and Volunteers. The conclusion seems to be that the sum of the various conditions which, taken together, we call "stamina" is the important element.

(iii.) The similarity of enteric fever and dysentery in these relations.

## 398 *Medical History of the South African War*

The following table summarises the results as regards dysentery :—

Incidence			Mortality		Case mortality		
Dysentery alone—							
Officers	R. & V.	—	Men —	Officers ? 72	Men 100	Officers —	Men —
	I. Y.	—	—	—	—	—	—
	R. V. & I. Y.	—	—	? 73	100	—	—
	Colonials	65	100	—	—	—	—
	Total	89	100	? 71	100	—	—
All bowel complaints—							
Officers	R. & V.	115	Men 100	Officers ? 73	Men 100	Officers 65	Men 100
	I. Y.	—	—	—	—	—	—
	R. V. & I. Y.	113	100	? 73	100	66	100
	Colonials	68	100	—	—	—	—
	Total	? 104	100	? 71	100	69	100

(There was an unusual proportion of diarrhoea cases among the officers, R. & V.)

### *Regulars and Volunteers. — Imperial Yeomanry.*

Dysentery alone—								
Officers	R. & V.	—	I. Y.	—	R. & V.	—	I. Y.	—
Men	88		100					
All bowel complaints—								
Officers	R. & V.	—	I. Y.	—	R. & V.	—	I. Y.	—
Men	88		100		—		—	

### *Regulars and Volunteers and Imperial Yeomanry. — Colonial.*

Dysentery alone—								
Officers	R. V. & I. Y.	264	Col. 100	R. V. & I. Y.	—	Col. —	R. V. & I. Y.	Col. —
Men	180		100	182		100	—	—
All bowel complaints—								
Officers	R. V. & I. Y.	188	Col. 100	R. V. & I. Y.	—	Col. —	R. V. & I. Y.	Col. —
Men	173		100	181		100	—	—

From this we can see that the results vary in the same direction as those for enteric fever. This shows that there is no evidence of general antecedent infection among the groups previously exposed. The differences, however, chiefly affect the incidence rates, which are less reliable than the mortalities, as they are so much influenced by habit, as seen in the greater proportion of admissions for diarrhoea among the officers of the Regulars and Volunteers. The men of the Regulars and Volunteers showed a smaller incidence than those of the Imperial Yeomanry, both in dysentery and all bowel complaints, the mortality and case mortality are identical within the limits of error. The officers and men of the Regulars, Volunteers, and Imperial Yeomanry showed a higher incidence rate, and the men a higher mortality than the same classes of the Colonial troops; the case mortalities are identical within the limits of error. Among the Regulars, Volunteers, and Imperial Yeomanry the incidence rate was the same in officers within the limits of error.

Colonial officers showed a smaller incidence but the same mortality as their men. The case mortality of officers and men in each group was indistinguishable within the limits of error, though not for all bowel complaints, where it was less among the officers.

The mortality rates for dysentery, arranged in order of magnitude, are as follows (the sequence is the same as in the case of enteric fever):—

Men	Imperial Yeomanry	..	..	..	..	..	3.62 per 1,000
	Regs. and Vols.	..	..	..	..	..	3.28 ..
Officers	Imperial Yeomanry	..	..	..	..	..	2.69 ..
	Regs. and Vols.	..	..	..	..	..	2.38 ..
Men	Colonials	..	..	..	..	..	1.81 ..
Officers	Colonials	..	..	..	..	..	1.34 ..

Instead of showing an interrupted series as in enteric fever, these rates show no distinctive differences between any two consecutive values if the limits of error are considered.

If, then, the smaller non-significant variations are eliminated, we find here fewer and smaller differences in the incidence, mortality, and case mortality of the various groups than in the case of enteric fever. "Stamina" appears to have been of much less importance, though not negligible, probably because acute dysentery (at least in South Africa) is, on the whole, as regards its immediate severity, a much less serious disease than enteric fever, and its shorter duration does not involve so prolonged a demand on reserves of strength. One cannot, of course, compare the case mortalities in the two diseases; the enteric fever ratios are almost entirely concerned with fresh infections, those for dysentery include both fresh infections and relapse cases, so that in dysentery the actual proportion of deaths to infections is higher than is shown in these tables. This, however, must always be the case, except where special care is taken to differentiate the admissions into the two groups.

There is no evidence of the effect of previous infection producing a higher incidence rate in those previously exposed; this, however, may be obscured by the preponderance of fresh infections. There is, on the other hand, a tendency to the same type of distribution as in enteric fever, a smaller incidence and mortality among the seasoned men. The question naturally arises whether any other differences existed among these groups beyond those already mentioned. The Colonial troops, especially the over-sea Colonials, as a whole, were inclined to drink tea rather than raw water. But in the other troops this habit became established after the earlier

period, where and when it was possible to boil water, and these possibilities were the same for both groups. Further, the compulsory boiling of water was carried out when possible, and probably more by the regular troops than by any other group. So that this difference in habit was probably of less importance than at first appears. On the other hand, the Regulars and Volunteers were the only troops who made any systematic attempts at satisfactory sanitary arrangements. The Colonial troops were careless in this respect, and the Irregular Corps absolutely impossible. It is, of course, the case that this neglect may have affected other bodies than those actually at fault, but this applies only in the field; in camp the sinners too would be exposed to a greater risk of infection. It does not appear that the differences in environment are by any means sufficient to explain the differences in the results as shown above.

As regards the greater incidence of enteric fever among the officers of the Regulars and Volunteers than among the men, a comparison with the Indian records is interesting. (See Army Medical Department report, 1908, p. 104.) Taking the years 1898-1908 (both inclusive) for India, the results are shown below:—

Incidence.	Officers.	India ..	143	South Africa ..	106
	Men.	..	100	..	100
Mortality.	Officers.	..	100	..	70
	Men.	..	100	..	100
Case mortality.	Officers.	..	72	..	66
	Men.	..	100	..	100

That is, the incidence among the officers was distinctly higher in India relatively to that among the men than in South Africa; the mortality was also higher, but the case mortality was about the same.

The South African rate among the officers was about 5·5 times the Indian rate; among the men it was about 7·6 times the Indian rate. There are certain obvious and well-marked differences in the environment of the officer in India as compared with the man; these differences were in South Africa largely negligible. It is not probable that the age composition of the group officers was more favourable than in India; indeed, the opposite is probably the case. Both groups, officers and men, were exposed to a maximum infection in South Africa, but one group showed a definitely greater increase than the other if the Indian rates are taken as a standard. There seems to be only two possible explanations of this difference—either the officer was relatively more careful in South Africa than in India, or there is some element in the environment in India

which is less favourable to the officer than any of the conditions affecting the life of the men.

There was one considerable difference in the relation of the officer to the man in South Africa as compared with India, and that was in the matter of food. In India both classes probably make use of an excessively nitrogenous diet, and for a part of the time the same thing occurred in South Africa. But taking the War as a whole, the food of the officer resembled that of the man far more than it does in India, both as regards quantity and composition. This difference is suggestive in view of the hypothesis that has been advanced from time to time that an excessive meat diet, with intestinal putrefaction as a sequel, increases the liability to attack. It is in any case clear that the difference is not one of diagnosis—that is, that the incidence rate in India is not artificially raised by the inclusion of mild cases which are omitted among the men, for the mortality per 1,000 among the group officers in India is not only the same as among the men, but shows a similar variation from year to year.

The results shown in these tables may be summarised as follows:—

(a) As regards enteric fever, the experience of previous years is found to apply during war as well as in peace—that is, such troops as have been exposed to infection, and of whom a certain number have been attacked and survived, show a degree of protection as compared with others who have not been similarly exposed. This protection is, however, likely to break down under extreme conditions.

(b) Officers continue to show a higher incidence rate but a smaller case mortality than the men.

(c) Though less well marked, the distribution of dysentery among the various groups tends to resemble that of enteric fever.

(16) *Comparative Incidence and Mortality per 1,000 by Arms of the Service and by Corps.*—In using these tables, three things must be remembered:—

(i.) That the incidence and mortality rates are not *annual* rates, and are therefore not comparable with the rates given elsewhere; they are calculated from the total of the *recorded* cases and deaths during the whole of the War in relation to *the strengths embarked*, which strengths vary materially from the actual numbers exposed to risk. This is unavoidable, as detailed strengths are not available.

(ii.) The Imperial Yeomanry were exposed for a less period than the various groups of the Regular Army; they were not present in

any numbers till the end of March, 1900. The C.I.V.'s were exposed for a still shorter period—from January to October, 1900, only.

(iii.) There is, however, probably no serious error in comparing the various groups of the Regular Army with one another.

## A.

*All Continued Fevers—*

				Rates per 1,000 of strength	
				Incidence	Mortality
Household Cavalry	..	..	..	381·8	The mortality is practically that of enteric fever.
Cavalry	..	..	..	349·8	
A.S. Corps..	..	..	..	336·8	
Royal Artillery	..	..	..	326·5	
Imperial Yeomanry	..	..	..	326·5	
R.A.M. Corps	..	..	..	322·6	
Guards	..	..	..	315·4	
Royal Engineers	..	..	..	302·8	
A.O. Corps..	..	..	..	263·2	
Infantry	..	..	..	217·0	
C.I. Volunteers	..	..	..	201·7	
Average	..	..	..	304·05 ± 10·69	
Range	..	..	..	336·07 — 271·93	
Variability	..	..	..	17·3 % ± 2·56 %	

## B.

*Enteric Fever alone—*

				Incidence	Mortality
Household Cavalry	..	..	..	291·1	50·43*
A.S. Corps..	..	..	..	236·7	31·85
R.A.M. Corps	..	..	..	220·9	28·61
Cavalry	..	..	..	217·3	30·05
Royal Artillery	..	..	..	207·8	28·37
Royal Engineers	..	..	..	204·0	31·25
A.O. Corps	..	..	..	194·3	37·51*
Guards	..	..	..	186·2	25·58
Imperial Yeomanry	..	..	..	139·9	28·37
Infantry	..	..	..	134·5	19·49*
C.I. Volunteers	..	..	..	127·3	23·41*
Average	..	..	..	196·4 ± 9·45	29·86 ± 1·73
Range	..	..	..	224·7 — 168·0	35·05 — 24·67
Variability	..	..	..	23·66 % ± 3·61 %	28·55 % ± 4·43 %

In both tables the incidence rates which are bracketed together are (within the limits of error) indistinguishable. In the mortality table, all the rates except the four starred, are identical within the limits of error.

Considering first the incidence rates for all continued fevers, the same predominance among the cavalry is found to occur that has been recognised in America in the recorded incidence of enteric

fever,<sup>1</sup> and in India.<sup>2</sup> At the other extreme we find a comparatively small incidence rate among the infantry, the strongest body in the field. Turning to the table of enteric fever rates, practically the only difference is that the cavalry and Army Service Corps have changed places.

Among the mortality rates, four differ materially from the rest. One, the City Imperial Volunteers, is excluded for reasons stated above, the Army Ordnance Corps show a rate slightly outside the limit, the Household Cavalry a rate largely outside the limit; both these rates however are affected by very large probable errors, and probably the only significant difference in the whole series is the low mortality rate for the infantry. Except for this group, it is hardly possible to say that one corps had a mortality rate which differed essentially from the others.

The lower incidence and mortality in the infantry is very striking, and we have nothing which points to an explanation. The difference may be due, at least to some extent, to their much larger numbers, but the fact noted by Major McCulloch (*loc. cit.*), should be noted—that of the greater incidence in all corps who have to do with animals, possibly through their greater exposure to dirt, dust and fly infection.

(17) *The Results of Anti-typhoid Inoculation.*—The remarks which have been made in the last section relating to the mode of calculation of the ratios applies to the following tables also.

The records of inoculation and of attack or death have been prepared as follows: Nominal rolls by corps were prepared at the time of inoculation, showing the men inoculated. The total on the roll subtracted from the strength embarked gave the number not inoculated. Here we have the strength of the two groups; but it is unfortunate that no more exact detail of the numbers exposed can be obtained.

Each case of enteric fever admitted to hospital was written on a card, showing also the result—death or recovery. These cards, assembled by corps, were compared with the nominal roll; the total of the cards corresponding to names on the roll gave the number of admissions and deaths among the inoculated, the remainder, those not found on the roll, gave those among the non-inoculated. From these results the attached table was prepared.

<sup>1</sup> Munson, "Mil. Hygiene," p. 690.

<sup>2</sup> McCulloch, A.M.D. Report, 1900, p. 421, *et. seq.*

The following summary shows the aggregate result :—

C.					
		Incidence		Mortality	Case mortality
Non-inoculated	..	208·76 ± 9·98	..	32·32 ± 2·08	.. 14·34 ± 0·11
Inoculated	..	100·72 ± 5·81	..	10·02 ± 1·24	.. 11·50 ± 0·57
Difference	..	108·04 / 11·54	..	20·30 / 1·70	.. 2·84 / 0·58
Approximately	..	2:1	..	3:1	5:4

The case mortality shown here is the mean mortality, *i.e.*, total cases and deaths in each group—inoculated or not—taken as a whole, and is probably nearer the truth than the average shown in the subsequent table.

The following table shows the ratio of the incidence among the inoculated to that among the non-inoculated :—

D.					
Household Cavalry	..	0·296	Infantry	..	0·602
Cavalry	..	0·315	C.I. Volunteers	..	0·182
Imp. Yeomanry	..	0·760	A.S. Corps	..	0·454
Royal Artillery	..	0·556	R.A.M. Corps	..	0·651
Royal Engineers	..	0·456	A.O. Corps	..	0·233
Guards	..	0·755	Total attacks	..	0·482
			Total deaths	..	0·331

See notes to the complete table on p. 44.

The following table shows the percentage of each corps that was inoculated :—

E.					
Household Cavalry	..	14·98			
Cavalry	..	7·23			
Imperial Yeomanry	..	4·29	A.S. Corps	..	1·25
Royal Artillery	..	6·14	R.A.M. Corps	..	11·93
Royal Engineers	..	8·60	A.O. Corps	..	3·22
Guards	..	8·43			
Infantry	..	3·68	Mean of the whole		
C.I. Volunteers	..	56·11	strength noted	..	4·46

The table (D) showing the ratio between the incidence among the inoculated and non-inoculated shows considerable variations, and some of the results are hardly trustworthy owing to the small numbers involved, notably the Household Cavalry, Royal Engineers, Army Service Corps, and Army Ordnance Corps.

It is known that the efficiency of the process of inoculation varied in different groups of men. Some were inoculated before embarkation, others on board ship, and sometimes the process was not fully carried out on board the transports. It is not, however, possible to account in this way for the variations in the results of inoculation between one group and another, for the individuals of

each group were not invariably separated from one another on the passage out, and the mode of performance of the inoculation on any one transport therefore affected more than one group of men.

Lieutenant-Colonel Sir W. B. Leishman, F.R.S., has been good enough to add the following remarks on the results shown above :—

“As Lieutenant-Colonel Simpson has already indicated the principal fallacies in the above tables, I need only add a few comments upon some points which have not been dealt with by him.

“(a) As regards the table showing the ratio of incidence among the inoculated to that among the non-inoculated. It appears impossible, under the conditions prevailing on active service, to secure that there shall have been identical conditions as regards exposure to infection, &c., in the two groups of inoculated and non-inoculated. Information as to the protective effects of inoculation would appear to be more valuable when drawn from a single regiment or unit rather than when compiled from the totals of corps composed of many such units, as has been done in the table—*e.g.*, a cavalry regiment with a large inoculated strength may have been exposed to infection over a long period, while another, with very few inoculated men, may have hardly been exposed at all, and *vice versa*. The statistical results of inoculation might be valuable in each individual regiment where the two groups had been more or less under identical conditions, but the combined figures of the two regiments might prove very fallacious.

“(b) The tables do not afford any information relating to the period which had elapsed between inoculation and attack. In view of the length of the campaign, and in the light of the remarks made in paragraph (c) (see below), it is certain that many men who had been inoculated must have outworn their immunity by the time they were attacked.

“(c) It is also, naturally, impossible in such tables to take into consideration the facts as to the number of doses of vaccine which the inoculated men had received. It is certain that a considerable proportion only received the first dose and not the two doses which are considered essential to obtain the maximum degree of protection.

“(d) No distinction has been drawn between para-typhoid fever and enteric. Anti-typhoid vaccine will not protect against the former, which is now known to be of frequent occurrence in South Africa.

“(e) The vaccines used to inoculate the troops during the War were sterilised at a temperature which has been shown by sub-

sequent investigation to be higher than is advisable. These investigations have further shown that the immunity conferred by such superheated vaccines is less in degree, and much more transient, than that resulting from vaccines sterilised at lower temperatures. Viewed from this standpoint it is extremely probable that the various vaccines employed differed in their immunising properties, and that, in the case of some of them, little or no immunity would remain three or four months after inoculation. This would appear to be one of the chief explanations of the comparatively poor results obtained during the War, as contrasted with those recorded in recent times.

“(f) It is noteworthy that, in spite of all these factors, the general analysis of the results should show that typhoid was twice as common in the non-inoculated as in the inoculated, and, in my opinion, it is even more striking that, in every corps, without exception, the ratio should have been in favour of inoculation.”

(18) *Conclusion*.—After a careful review of all the conditions associated with the development of epidemic disease, and more especially of enteric fever, it is not possible to be very hopeful with regard to the total abolition of these diseases in the field. Two things are essential—the Army as it takes the field must be free from infection, and it must be maintained free. The first of these propositions presents no insuperable difficulty in the case of an army composed of professional soldiers—*i.e.*, of men of continuous service, constantly under discipline and available for observation; it is merely a question of persistent elimination of carriers. The question becomes enormously complicated by the introduction first of all of soldiers who do not serve continuously, and still more by the employment of civilians, or, what is the same thing, of men specially enlisted to complete establishments. It is absolutely certain that at the time of mobilisation we must take these men as we find them or lose them altogether. So long as we are concerned only with men from this country the danger is relatively small, but when part of our force is drawn from countries in which enteric fever is more widely diffused than in Great Britain, it becomes very much greater, and the next time we put a large army in the field a part of it will again be drawn from these sources. Where natives are employed (as in the transport), the case becomes hopeless as regards the mobilisation of the force free from infection.

Let us suppose that we have succeeded in achieving the impossible—that is, we have placed an army in the field free from all internal infection, say, in our own country. Small as is the

incidence of enteric fever in Great Britain, it is sufficient to form a large number of infective foci; and so we have even here a considerable risk of external infection. How are we to avoid the infection of our force, or at least to limit its spread? There is but one external agent (and that giving less than complete protection)—protective inoculation, which must be carried out some time before mobilization, and probably periodically throughout the service of the individual, whether it is continuous or not. All the rest must be done within the army itself.

Here, again, no matter what schemes are promulgated, what organisations are developed during peace, in war the basis of the whole framework of effective sanitation is the personal responsibility of each individual of the force. No sanitary scheme will be as effective in the field as it should be until the instincts of the individuals of the force are towards cleanliness in every form; the individual's action must be automatic, and not the result of conscious effort in compliance with instructions.

The only way to ensure this is to stimulate the sanitary sense, or to create it where it is absent, throughout the whole of the population of the Empire. This is of course difficult and will take time, for one of the disadvantages of civilisation is that the individual is relieved of all responsibility for the disposal of his excreta—a condition which does not exist under the barbaric regime of war. The people should understand that the final responsibility for epidemic disease in the field does not rest with the medical service, nor with the army itself, but with the general population and its instructors in sanitation. We must of course do what we can to render sanitary cleanliness automatic in the army. This is being done, and without doubt will prove beneficial, but it takes time to ensure that the reflex chain will not break down under the special strain of war.

We have succeeded in the analogous case of personal cleanliness. Custom, discipline, and increasing facilities have made the soldier a clean man—how clean can best be determined by those who have had opportunities of seeing the reserve man or old soldier among his civilian fellow workman. The habit of cleanliness was so fixed, at least in many corps, that it withstood the trials of war; and the soldier was as clean as his officer. We must attain the same standard in sanitary matters. As a general rule, the "smarter" the corps the better is its interior economy, and the higher its standard of personal and sanitary cleanliness. Within the range of one's personal observation, in only one "smart"

regiment was the interior economy, the care of the men, below the standard; and that regiment's reputation in the field suffered severely in South Africa.

Behind all these problems of sanitation—that is the protection of the individual from disease and death, lies the question of the effect of this constant war against disease on the spirit of the men. We have, in fact, to teach the man that it is his duty to preserve himself from disease in order that he may have a better chance of being shot. Taking matters on the lower plane, we can of course prove to him that if conditions continue as they were, his chance of death from disease is about twice as great as of being shot, so that he will improve his expectation of life by attention to sanitation. That however is hardly the point in question, which is whether the constant precaution which he has to observe as a vital unit will not instinctively spread to his militant aspect, and reduce his fighting value. This appears to be analogous to the change in the mental attitude involved in the introduction of the modern attack in extended order, taking advantage of all available cover. No doubt it has been found, here and there, that too great affection for cover developed, but the general result has been shown to be perfectly satisfactory. The quiet, manly soldier of the present day has done as good work as the drunken, dissolute men of Flanders and the Peninsula. When the unremitting individual war against disease becomes subconscious, the effect on the mental attitude of the soldier disappears. Our aim should be to develop the intelligence of the soldier, by no means of a low grade, and without dry-nursing him, to induce a habit of sanitary cleanliness which is as automatic as his response to the word of command on the parade-ground.

#### SUMMARY.

##### *A. General Results:—*

(1) *The total corrected admission-rate* for all causes during the whole campaign was 958 per 1,000 per annum. Of this, 813, or 88 per cent. was due to disease. The weighted mean in twelve of our tropical campaigns for disease admissions was 1,050, or 91·5 per cent. of the total admission-rate. In the South African War the proportion of disease admissions was then less than the average, and the actual admission-rate was considerably less.

(2) *The disease admission-rate, 843, is made up as follows:—*

Fevers .. ..	261	<i>Continued</i> ..	201	<i>Malarial</i> ..	57	} 389
Bowel complaints ..	128	<i>Dysentery</i> ..	86	<i>Diarrhœa, &amp;c.</i> ..	42	
Other diseases ..	454					

The group that may be termed "climatic" then accounts for 389, or 46 per cent., and the continued fevers for 24 per cent. of the total disease admission-rate.

(3) *The total mortality from all causes was (including killed in action) 38.09 per 1,000 per annum* Of this, 24.58, or 64 per cent. of the total mortality, was due to disease. This proportion is less than that found in the Crimean War and the first year of the American Civil War. These ratios are largely conditioned by circumstances unconnected with the incidence of disease.

(4) *Excluding killed in action, the mortality was 28.5 per 1,000, of which disease contributed 24.58, or 86 per cent., which is the proportion found in our previous campaigns.*

(5) *The disease mortality, 24.58, is made up as follows:—*

Fevers .. ..	18.31	Continued..	18.11	Malarial ..	0.20	} 21.38
Bowel complaints..	3.07	Dysentery ..	3.02	Diarrhoea, &c...	0.05	
Other diseases ..	3.20					

The "climatic" group accounts for 21.38, or 87 per cent; the continued fevers (practically enteric fever alone), for 74 per cent. of the total disease mortality. The mortality from dysentery alone equals that from non-climatic diseases.

(6) *The predominance of the epidemic diseases, the continued fevers and dysentery, confirms the experience of former campaigns, but in the South African War the proportion of admissions from these two causes was relatively low; the proportion of the disease mortality was about the average.*

(7) *The case mortality of enteric fever was very much lower than the average case mortality over twelve campaigns, 13.90 per cent. as against 29.85 per cent., or certainly less than half. The case mortality for the whole of the continued fevers was slightly less—8.87 per cent. against 9.92 per cent.*

(8) *Of the total continued fevers admitted to hospital, nearly two-thirds (63.5 per cent.) were diagnosed enteric fever, an unusual proportion, and taking the evidence of the case mortality into consideration, the conclusion is that in no previous campaign has enteric fever been diagnosed so freely, and that our admission-rate in South Africa must be reduced by at least one-third to make it comparable with those in other campaigns.*

(9) *Protection against enteric fever by previous exposure, infection, and attack was evident as between the various classes of which the army was composed, except under conditions of exceptional severity.*

(10) *Dysentery* showed in a lesser degree the same variation from group to group as did enteric fever.

*B.—Causes Contributing to Prevalence :—*

(1) Enteric fever and dysentery were endemic and occasionally epidemic throughout the whole area of operations before the War.

(2) Such methods of sanitation as existed were, at the best, very imperfect.

(3) The operations took place almost entirely within the area of the summer rains, where enteric fever is always more prevalent than elsewhere.

(4) The composition of the force was exceptional ; 55 per cent. of the total embarked was almost entirely without any acquired immunity against enteric fever.

(5) The sanitary organisation of the Army was not adapted for the requirements of the situation, largely owing to the small proportion of the trained officers of the Royal Army Medical Corps.

*C.—The Mode of Development of the Continued Fevers :—*

Where it has been possible to obtain particulars of the prevalence in large, isolated bodies of men at the beginning of the campaign, the following features were common :—

(1) A very slight irregular development lasting about eight weeks from the beginning of exposure, followed by

(2) A period of sudden and sharp development to a maximum, lasting about four weeks, followed by

(3) A decline, more or less well marked, and by later recrudescence of disease.

(4) A very sharp distinction from the mode of development of bowel complaints, except in the case of Ladysmith.

(5) After June, 1900, the prevalence of enteric fever was general, but no great epidemics occurred.

*D.—The Mode of Development of Dysentery and Diarrhœa :—*

(1) These show an early and rapid development *immediately* after exposure.

(2) Except in Ladysmith, their general prevalence was not at any time comparable with that of the continued fevers.

(3) Except in Ladysmith, there was no tendency to excessive prevalence at certain periods ; on the other hand there was a limitation in the degree of development.

(4) Dysentery was the predominant type throughout ; except at Modder River and Bloemfontein it appeared earlier and in greater proportion during the first weeks of exposure.

*E.—The Propagation of Epidemic Disease :—*

(1) Antecedent foci of infection existed when the troops took the field. Numerous other foci were established after their arrival.

(2) The modes of dissemination included practically every known method.

(3) Opportunities for water infection were numerous; they probably contributed to the total of the infections, but their influence in the spread of disease appears to have been secondary to

(4) Contact infection, direct from man to man, or more remote through latrines, &c.

*F.—Accessory Influences :—*

Their effects were obscured by the more potent influences at work.

*G.—Protective Inoculation against Enteric Fever :—*

(1) The aggregate results show a diminution in the inoculated cases as follows: Incidence about one-half, mortality about one-third, case mortality about one-fifth.

(2) In the same corps the recorded incidence among the inoculated was always somewhat less than among the non-inoculated.

OFFICERS.

Exposed to risk :	Regulars and Volunteers					Imperial Yeomanry					Regulars, Volunteers, and Imperial Yeomanry					Colonials					Total				
	Cases	Per 1,000	Deaths	Per 1,000		Cases	Per 1,000	Deaths	Per 1,000		Cases	Per 1,000	Deaths	Per 1,000		Cases	Per 1,000	Deaths	Per 1,000		Cases	Per 1,000	Deaths	Per 1,000	
	<b>13,467</b>					<b>1,487</b>					<b>14,954</b>					<b>4,479</b>					<b>19,433</b>				
Enteric fever	1,920 (1,648)	142.57 ± 2.03	183 157	13.59 ± 0.67	—	180 150	121.05 ± 5.70	22 18	14.75 ± 2.11	—	2,100 1,798	140.43 ± 1.92	205 175	13.71 ± 0.64	—	318 268	71.00 ± 2.59	35 30	7.81 ± 0.79	—	2,418 2,066	124.43 ± 1.17	240 205	12.34 ± 0.53	—
Simple continued fever	1,144 (982)	84.95 ± 1.62	—	—	—	114 95	76.66 ± 4.66	—	—	—	1,258 1,077	84.12 ± 1.53	—	—	—	167 141	37.28 ± 2.83	—	—	—	1,425 1,218	73.33 ± 1.26	—	—	—
Total ..	3,064 (2,630)	227.52 ± 2.44	183 157	13.59 ± 0.67	—	294 245	197.72 ± 6.97	22 18	14.75 ± 2.11	—	3,358 2,875	224.55 ± 2.30	205 175	13.71 ± 0.64	—	485 409	108.28 ± 3.13	35 30	7.81 ± 0.79	—	3,843 3,284	197.75 ± 1.93	240 205	12.34 ± 0.53	—

OTHER RANKS.

Exposed to risk :	Regulars and Volunteers					Imperial Yeomanry					Regulars, Volunteers, and Imperial Yeomanry					Colonials					Total				
	Cases	Per 1,000	Deaths	Per 1,000		Cases	Per 1,000	Deaths	Per 1,000		Cases	Per 1,000	Deaths	Per 1,000		Cases	Per 1,000	Deaths	Per 1,000		Cases	Per 1,000	Deaths	Per 1,000	
	<b>415,019</b>					<b>30,682</b>					<b>445,701</b>					<b>102,536</b>					<b>548,237</b>				
Enteric fever	55,970 (45,401)	134.87 ± 0.36	8,041 6,323	19.37 ± 0.14	—	5,923 4,921	193.05 ± 1.52	800 665	26.07 ± 0.61	—	61,893 50,322	138.87 ± 0.35	8,841 7,188	19.84 ± 0.14	—	9,322 7,362	90.91 ± 0.60	1,063 831	10.36 ± 0.21	—	71,215 57,684	129.90 ± 0.31	9,904 8,022	18.06 ± 0.12	—
Simple continued fever	33,442 (27,130)	80.58 ± 0.28	28 23	0.07 —	—	2,493 2,074	81.25 ± 1.05	—	—	—	35,935 29,204	80.63 ± 0.27	28 23	0.06 —	—	4,846 3,829	47.26 ± 0.45	—	—	—	40,781 33,093	74.38 ± 0.24	28 23	0.05 —	—
Total ..	89,412 (72,531)	215.45 ± 0.43	8,069 6,546	19.44 ± 0.14	—	8,416 6,995	274.30 ± 1.72	800 665	26.07 ± 0.61	—	97,826 79,526	219.50 ± 0.42	8,869 7,211	19.90 ± 0.14	—	14,168 11,191	138.17 ± 0.73	1,063 884	10.36 ± 0.21	—	111,996 90,717	204.28 ± 0.37	9,932 8,045	18.11 ± 0.12	—

OFFICERS.

Exposed to risk :	13,467	1,487	14,954	4,479	19,433
Dysentery	1,204 ± 1.66 1,034	137 ± 5.06 114	2.69 ± 0.91 1,148	33.94 ± 1.82 5	1.34 ± 0.37 1,493 76.83 ± 1.29 36
Diarrhoea	757 ± 1.34 650	79 ± 3.92 66	836 ± 1.28 716	16.52 ± 1.28 63	910 ± 1.02 778 46.83 ± 1.02 —
Inflamma- tion of in- testines	217 ± 0.73 186	25 ± 2.25 21	242 ± 0.69 207	5.80 ± 0.76 23	268 ± 0.56 229 13.79 ± 0.56 2
Total ..	2,178 ± 2.14 1,870	241 ± 6.45 201	2,69 ± 0.91 2,071	56.26 ± 2.38 —	1.34 ± 0.37 2,671 137.45 ± 1.67 2,283 44 ± 0.23 38

OTHER RANKS.

Exposed to risk :	415,019	30,682	445,701	102,536	548,237							
Dysentery	38,483 { 31,287	1,361 { 1,106	3.28 ± 0.06 2,591	3.24 ± 0.23 90	111 ± 3.90 90	3.62 ± 0.23 33,878	1,472 ± 0.29 1,196	52.11 ± 0.47 4,230	186 ± 0.11 147	181 ± 0.11 38,108	85.81 ± 0.26 1,843	1,658 ± 0.05 —
Diarrhoea	18,360 { 14,927	44.24 ± 0.21 20	0.06 ± 0.06 1,596	64.53 ± 0.98 —	25 ± 0.21 20	20,340 ± 0.21 16,523	25 ± 0.21 20	27.01 ± 0.34 2,193	— ± 0.34 —	23,110 ± 0.18 18,716	42.15 ± 0.18 20	25 ± 0.05 —
Inflamma- tion of in- testines	1,647 { 1,339	3.97 ± 0.07 38	0.11 ± 0.07 112	4.83 ± 0.07 —	47 ± 0.06 38	1,786 ± 0.06 1,451	47 ± 0.06 38	3.53 ± 0.12 287	10 ± 0.12 8	0.10 ± 0.12 —	2.48 ± 0.06 1,738	57 ± 0.06 46
Total ..	58,490 { 47,553	140.94 ± 0.38 1,163	3.45 ± 0.06 4,299	173.82 ± 1.46 90	111 ± 1.46 —	3.62 ± 0.23 63,823	1,544 ± 0.35 1,254	82.66 ± 0.58 6,710	196 ± 0.09 155	1.91 ± 0.09 —	72,298 ± 0.31 58,562	1,740 ± 0.06 1,409

NOTE. The lighter figures are the actual numbers as taken from our records.  
.. Inflammation of the intestines" includes (a) Enteritis, (b) typhilitis, (c) colitis.

COMPARATIVE INCIDENCE, MORTALITY AND CASE MORTALITY AMONG INOCULATED AND NON-INOCULATED, SOUTH AFRICAN WAR, 1899-1902.

Corps	STRENGTH EMARKED			INOCULATED		NON-INOCULATED		TOTAL RATIOS PER 1,000		INCIDENCE PER 1,000		MORTALITY PER 1,000		CASE MORTALITY PER 100.	
	Total	Inoculated	Non-inoculated	Cases	Deaths	Cases	Deaths	Incidence	Mortality	Inoculated	Non-inoculated	Inoculated	Non-inoculated	Inoculated	Non-inoculated
Household Cavalry ..	694	104	590	10	—	192	35	291.1 ±11.6	50.43 ±5.6	96.15 ±19.49	325.42 ±13.00	—	59.82	—	18.2
Cavalry ..	20,625	1,491	19,134	107	4	4,384	617	217.3 ±1.9	30.05 ±0.8	71.76 ±4.51	229.12 ±2.05	2.68	32.26	3.7	14.1
Imperial Yeomanry..	35,170	1,508	33,662	162	22	4,759	643	139.9 ±1.2	18.9 ±0.5	167.43 ±1.30	141.38 ±1.98	14.59	19.10	13.6	13.5
Royal Artillery ..	19,636	1,265	18,371	150	11	3,931	546	207.8 ±1.7	28.4 ±0.8	118.58 ±6.13	213.98 ±2.04	8.69	29.72	7.3	13.9
Royal Engineers ..	7,871	677	7,194	66	12	1,540	231	204.0 ±3.1	31.2 ±1.3	97.49 ±4.90	214.06 ±3.26	17.73	32.53	18.2	15.2
Guards ..	11,575	976	10,599	140	* 12	2,015	284	186.2 ±2.4	25.6 ±1.1	143.45 ±21.82	190.11 ±2.30	12.29	26.79	8.6	14.1
Infantry ..	215,129	6,523	208,606	537	72	28,409	4,120	134.5 ±0.5	19.5 ±0.2	82.82 ±2.30	136.18 ±0.51	11.04	19.75	13.4	14.5
C.I. Volunteers ..	1,666	935	731	81	16	131	23	127.3 ±5.5	23.4 ±2.5	86.60 ±6.20	179.20 ±9.57	17.11	31.46	19.8	17.6
Army Service Corps..	5,911	74	5,837	8	1	1,391	205	236.7 ±3.73	34.8 ±1.6	108.11 ±24.84	238.30 ±3.76	13.51	35.12	12.5	14.7
R.A.M. Corps ..	8,634	1,030	7,604	154	13	1,745	231	220.9 ±3.0	29.6 ±1.2	149.51 ±7.50	229.40 ±3.25	12.62	30.77	8.4	13.4
Army Ordnance Corps	1,333	43	1,290	2	—	257	50	194.3 ±7.3	37.5 ±3.5	46.51 ±21.65	199.22 ±7.50	—	38.76	—	19.5
Totals and average ratios	328,244	14,626	313,618	1,417	163	48,754	6,991	196.4 ±9.4	29.86 ±1.73	100.72 ±5.81	208.76 ±9.98	10.02 ±1.24	32.32 ±2.08	9.6 ±0.98	15.3 ±0.41

\* All in the Grenadier Guards.

Notes.—(1) R.A.M. Corps + St. John Ambulance Brigade are included. The following Corps have been omitted: Army Pay Corps, Military Police, Army Post Office Corps.

(2) The probable differences show that the distinction between the incidence in the two classes is significant, except in the Guards, but it has to be noted that the twelve cases among inoculated occurred in *one* battalion of the Grenadiers. It may also be noted that in the Imperial Yeomanry the distinction between the two classes is not very well marked.

(3) Probable errors have not been calculated for the mortality ratios. It is evident that among the inoculated cases such errors must be very great, and the error of the average mortality in each class appears sufficient.

(4) The average ratios are the arithmetical mean of those shown against each Corps.

## A SIMPLE MODIFICATION OF WASSERMANN'S REACTION.

BY LIEUTENANT-COLONEL C. BIRT.  
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A MIXTURE of the serum of a syphilitic subject with a dilution of an alcoholic extract of syphilitic liver or guinea-pig's heart differs from a similar mixture of the serum of a healthy person with these extracts. The reagents which are used to detect this difference consist of complement, red blood corpuscles and a serum hæmolytic to these cells. Wassermann employs as complement the fresh serum of a guinea-pig, as blood corpuscles those of the sheep, and as hæmolytic serum that of a rabbit which has received several inoculations with washed sheep erythrocytes. When Wassermann's discovery was announced in these columns (*JOURNAL OF THE ROYAL ARMY MEDICAL CORPS*, vol. viii., June, 1907, p. 568), it was recognised that a modification of the test in which a vivisection licence was not essential would be necessary for the widespread practice of serum diagnosis of syphilis in Great Britain and Ireland. It was suggested that human complement, human red blood corpuscles and a rabbit serum hæmolytic to them might be substituted for the respective components of Wassermann's reaction.

Tschernogubow (*Berliner klinische Wochenschrift*, November 22nd, 1908, p. 2107) was the first to practise such a method. He placed in a tube one part of the fresh blood withdrawn from a finger with ten parts of physiological saline fluid. In another tube he mixed one volume of fresh blood with ten of the dilution of extract. After incubating at 38° C., for one hour he added two and a half volumes of rabbit *v. man* serum to each tube and returned them to the incubator. Control experiments with normal and syphilitic blood were made at the same time. A positive reaction would be shown by lysis in the tube containing blood and saline fluid, but no lysis in that in which the extract was placed. I have followed his instructions in twenty-two cases. In ten readings could not be obtained on account of absence of laking in the control saline fluid tubes. Of the rest the blood of a patient in an early stage of the infection, strongly positive to Wassermann's test, gave a negative result. The method was therefore unreliable. The absence of lysis in the salt tubes was to be expected, since the time allowed for the first incubation—one hour—is generally insufficient for the elaboration of complement. It was attempted to remedy this defect

by allowing the tubes to stand for six to twenty-four hours. Here, again, the addition of fifty or sixty doses of hæmolytic amboceptor represented in the two and a half volumes of rabbit *v.* man serum failed to cause lysis in five out of twenty-seven experiments thus made. It was obvious that the proportion of red blood corpuscles was too large. The small quantity of complement produced could not lase the 9 per cent. blood cells present, though aided to the utmost by the multiple doses of hæmolytic amboceptor. The natural corollary, evidently, was to preserve the blood for five to twenty-four hours before use in order to permit the complement to attain its maximum, to withdraw the clear serum, and to add to it a small proportion of the corpuscles. This plan, which has been followed in over two hundred cases, has been found satisfactory and convenient on account of the stable properties of the substances employed. These are an alcoholic extract of guinea-pig's heart and a rabbit *v.* man serum. The extract is easily prepared by pounding a guinea-pig's heart to pulp in a mortar with the aid of broken glass. The paste is put into a well-corked bottle and is shaken up with a quantity of absolute alcohol equal to five times the weight of the heart. There is no necessity to heat to 60° C. nor to preserve it in the ice-chest, as is recommended by some. In two or three days the extract is ready for use and may be pipetted off the surface of the pulp as required. Filtration is unnecessary. By leaving the fluid in contact with the paste the extract increases in strength. The heart extract which is being used at the present time is five months old, and has undergone no deterioration. Besides this, syphilitic liver extracts prepared by Captain L. W. Harrison, and guinea-pig liver, rabbit and ox-heart extracts have been employed.

The serum hæmolytic to human blood was obtained by Major Harrison in November, 1909, from a rabbit to which he had given several intra-péritoneal injections of well-washed human blood corpuscles. Its hæmolytic property is such that one-twenty-fifth volume added to one volume of a six-hour-old human serum containing 5 per cent. erythrocytes, mixed with four volumes of saline fluid, causes complete lysis in ten minutes.

The technique adopted is as follows: The clear serum is withdrawn from the blood after standing for five to twenty-four hours. The pipette is then re-introduced to the bottom of the capsule or tube or into the clot and one-twentieth the quantity of blood corpuscles is drawn up. These are mixed with the serum which will then contain 5 per cent. red blood cells approximately. One volume

of this mixture of serum and blood corpuscles is added to four volumes of 0·9 per cent. salt solution, and also to four volumes of the various dilutions of extract placed in small tubes (0·6 by 4 cm.). It is important that the saline fluid used for diluting the serum and extract should be made with distilled water, since the presence of lime salts in tap-water has an inhibitory effect on hæmolysis. These are the details of an experiment:—

Tube 1.	0·05 cc. of serum containing 5 % red cells	+ 0·2 cc. 0·9 % salt solution.
„ 2.	„ „ „ „ „ „	+ 0·2 cc. of $\frac{1}{5}$ dilution guinea-pig heart extract.
„ 3.	„ „ „ „ „ „	+ 0·2 cc. of $\frac{1}{10}$ dilution guinea-pig heart extract.
„ 4.	„ „ „ „ „ „	+ 0·2 cc. of $\frac{1}{100}$ dilution guinea-pig heart extract.
„ 5.	„ „ „ „ „ „	+ 0·2 cc. of $\frac{1}{100}$ dilution guinea-pig heart extract.

The whole are incubated for one hour at 37° C., at the end of which it will be observed that no lysis of the red blood corpuscles has occurred. They will be seen lying at the bottom of each tube, leaving the fluid above clear. To each tube is then added one-fifth volume of rabbit *v.* man serum—that is 0·01 cc., which is equivalent to five hæmolytic doses. The tubes are shaken and are returned to the incubator. Since the serum has been diluted five times, each tube of fluid will contain only 1 per cent. red blood cells. Lysis, accordingly, is usually complete in the control tube within a few minutes of adding the hæmolytic serum. If the blood has been derived from a healthy individual, hæmolysis will occur in the tubes containing the heart extract, though in tube 2, which has the largest dose, some delay may be observed. Should, on the other hand, the serum be syphilitic, there will be no laking in the extract tubes if the blood be taken from an early untreated case with secondary manifestations. If the patient has undergone efficient treatment, then tube 5 may show complete lysis, 4 a faint trace in half an hour, but 2 and 3 will remain unlaked. Thus we obtain a quantitative estimate of the power of a serum.

A second series of tubes is prepared in which a normal serum takes the place of the suspected, and a third series in which a serum of a florid case of secondary syphilis is substituted for the suspected serum. Such is the test as carried out\* when the supply of blood, obtained by vene-puncture, is ample. It may be successfully performed with so little as 0·2 cc., but in this case the quantity will allow of a control and one extract tube only. Hence, blood collected in capsules from a prick of the finger will suffice.

## 418 *A Simple Modification of Wassermann's Reaction*

Two hundred and three examinations of blood have been made, and the results compared with those given by Wassermann's method and with those depending on the presence in human serum of amoebocytes, hæmolytic for sheep and guinea-pig red blood corpuscles.

	Positive			Negative			Percentage of positive reactions
Primary syphilis.. ..	1	..	.	16	..	.	6 per cent.
Early secondary syphilis	31	..	.	2	..	.	94 ..
Late secondary syphilis..	22	..	..	6	..	..	79 ..
Latent syphilis .. .	29	..	..	39	.	..	42 ..
Controls .. .	—	..	.	57	..	..	nil.

Most of the cases of primary syphilis were examined immediately after admission to hospital on the day when the *Treponema pallidum* had been detected in the chancre. The early period of the infection would thus account for the preponderance of negative reactions.

The sixty-eight individuals who presented no specific symptoms at the time of veno-puncture had gone through protracted courses of treatment, and from a clinical standpoint were supposed to have recovered.

In 162 of these sera, Captain Harrison made examinations by Wassermann's test. Our readings corresponded in 90 per cent. of the cases. Our results disagreed seventeen times. In eleven syphilitic sera the human corpuscle method gave a positive response, and Wassermann's a negative. In six the contrary happened.

The reaction introduced by Hecht and extensively practised by Fleming, Bassett-Smith, Gibbon, Skelton, and others, in which the hæmolytic action of human blood on sheep's corpuscles is made use of, was also employed seventy-eight times to test the above sera. The readings were concordant in forty-nine. Hecht's reaction failed in eleven as there was no lysis in the control tubes. On fourteen occasions Hecht's method was positive, while the human cell method was negative, and in all of these the Wassermann reaction was also negative. On four occasions the results were reversed.

A procedure similar to Hecht's, except that guinea-pig corpuscles are substituted for sheep cells, was carried out in 101 instances. The results agreed on seventy-seven occasions. Readings could not be obtained in the guinea-pig blood tubes eleven times on account of the absence of lysis. In six the guinea-pig blood method gave a positive reaction, and the human corpuscle method a negative. In seven the reverse was noted.

The tests depending on the presence of amboceptors in human blood hæmolytic to sheep's and guinea-pig's blood corpuscles have given a larger number of failures than when human blood corpuscles have been utilised.

In all, 198 examinations have been made, using sheep's cells. In 62, or 31 per cent., satisfactory readings could not be obtained. When guinea-pig cells were employed in place of sheep corpuscles, 23 out of 145 experiments, or 16 per cent., were unsuccessful. Whereas, against the human red cell method are recorded only 14 failures in 203 tests, or in 7 per cent. This might have been expected; for in the former processes there are two variables on which the reaction depends—the complement and the hæmolytic amboceptor. In the modification now described there is only one variable, the complement. Since it is a well-recognised fact that a minimum dose of complement will produce lysis only in the presence of multiple doses of hæmolytic amboceptor, it follows that if the quantity of complement in a serum be small, approaching in fact the minimum dose, its hæmolytic action can still be exerted through the influence of the five doses of rabbit *v. man* serum added—an influence which would be wanting in Hecht's reaction, since the proportion of natural amboceptor in human serum is not so great.

It might be erroneously supposed that human complement would have but a feeble effect on human blood corpuscles treated with rabbit *v. man* serum; since guinea-pig erythrocytes, rendered sensitive by means of a similar rabbit *v. guinea-pig* serum, require a larger amount of guinea-pig complement than of complement derived from other animals to produce lysis in them. This is not the case, however. When blood is tested five to twenty-four hours after abstraction, the laking of the human red cells is almost always rapid. Sometimes, indeed, it occurs immediately after the addition of the rabbit *v. man* serum. The reaction has been successful as early as three hours and as late as four days after the withdrawal of the blood.

It might be urged that errors would arise in the variation of the amount of complement in human serum. But given a constant number of blood corpuscles, a constant dose of hæmolytic amboceptor, then the time of lysis varies with the quantity of complement. Thus we have a ready means of measuring the complement in a given serum by examining the control salt solution tube every few minutes. If we find that lysis is complete at approximately the same time in the control tubes which contain normal, syphilitic,

and the suspected serum, then we know their complement content is the same, and that the readings of the corresponding extract tubes will be strictly comparable. Should a serum have lost its complement the test can be performed by adding to each tube an equal volume of a normal serum which possesses complement.

Wassermann's reaction is less delicate than the above-mentioned modifications. Heating the serum to 55° C. for half an hour produces complementoid which sometimes masks the action and causes some specific sera to give a negative response. To overcome this disturbing effect Wechselsmann absorbs the complementoid by treating the heated serum with barium sulphate. Complementoid may be found also in the guinea-pig serum if it has been preserved longer than twenty-four hours. The process of heating the human serum for half an hour introduces a variable which it is desirable to avoid. Harrison has made an important advance by reducing the time of this operation to ten minutes. Therefore in a suspicious case in which the blood has proved negative by Wassermann's method, recourse should be had to these other modifications before a final opinion be pronounced. Hecht's method labours under the disadvantage of requiring newly-shed sheep's blood, to obtain a supply of which is attended with no little difficulty. Many failures have been caused by the use of sheep's blood cells more than twenty-four hours old.

In laboratories where the original Wassermann test is being carried out, the clot from the guinea-pig's blood, the serum of which is used as complement, provides a convenient source of blood corpuscles. If the clot be broken up in 0.9 per cent. salt solution and the washings centrifuged, a sufficient deposit of cells is obtained. After a second washing they are made into a 10 per cent. emulsion. These cells give more satisfactory readings than sheep's cells, since they are more easily laked by human serum than are the latter. The amount added should not exceed 1 per cent of the fluid in the tubes. Lysis of the controls must always be complete in reliable experiments.

Apart from the greater proportion of successful results which can be attained by the human erythrocyte test, the chief advantage lies in the fact that no perishable materials, no centrifuge, water-bath, or thermostat are required. Seligmann and Pinkus state that incubation at room temperature serves as well as at 37° C. The guinea-pig heart extract and rabbit *v.* man serum preserve their properties undeteriorated for months. Doubtless the firms which now supply sera including rabbit *v.* sheep will also provide rabbit *v.* man serum.

With the reagents constantly at hand this test is capable of more extended use than when substances so perishable and difficult to procure as fresh sheep or guinea-pig blood cells are required.

#### CONCLUSION.

The serum diagnosis of syphilis can be undertaken by employing the complement in the serum, and a small quantity of the red corpuscles of the blood under examination, guinea-pig heart extract, and rabbit *v.* man serum; both the latter are stable. Compared with Wassermann's reaction this modification has given reliable results, and has proved somewhat more sensitive. Compared with the methods depending on the presence of a natural amboceptor hæmolytic to sheep's and guinea-pig's corpuscles it has given a smaller proportion of failures.

I am greatly indebted to Captain L. W. Harrison, Royal Army Medical Corps, who has freely placed the resources of his laboratory at the Military Hospital, Rochester Row, at my disposal, and has supplied me with his clinical notes and the results of his own tests.

# THE DEVELOPMENT OF TRYPANOSOMES IN TSETSE FLIES.<sup>1</sup>

BY COLONEL SIR DAVID BRUCE, C.B., F.R.S.  
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IN the *Proceedings of the Royal Society* (B, vol. 81, 1909) a paper was published describing a single experiment illustrating the development of *Trypanosoma gambiense* in *Glossina palpalis*. This experiment was carried out at Mpumu, Uganda, near Lake Victoria, in the spring of 1909. Since that date many experiments, on the same lines, have been made, not only with *T. gambiense* but also with *T. dimorphon*, *T. nanum*, and *T. vivax*.<sup>2</sup> It is proposed to describe these further experiments in this paper.

It will be remembered that Kleine, in German East Africa, at the end of 1908, made the discovery that *Glossina palpalis* could convey *Trypanosoma brucei* for some fifty days after the fly had fed on an infected animal. Following Kleine's lead, our experiments were carried out at first with Lake-shore flies, afterwards with flies bred in the laboratory.

## A.—THE DEVELOPMENT OF TRYPANOSOMA GAMBIENSE IN GLOSSINA PALPALIS CAUGHT ON THE LAKE-SHORE.

These experiments were carried out with ordinary wild tsetse flies caught on the Lake-shore, and therefore open to the doubt that some of them may have been naturally infected when they were captured. As there is some evidence that one fly in 400 or 500 of the wild Lake-shore flies is found to be naturally infected, it is evident that these previously infected flies may lead into error. It will be seen later that this risk is not run when flies bred in the laboratory are used.

The flies when brought up from the Lake-shore were kept in small boxes with mosquito-netting sides, and placed over dishes containing water, to imitate, as far as possible, their natural conditions. It may be remarked here that these tsetse flies are so numerous on the shores of Victoria Nyanza, and the supply so unending, that the fly-boys brought up some 500 every day, and these usually caught at only one or two spots.

<sup>1</sup> Printed by permission of the Royal Society.

<sup>2</sup> These names may require to be changed when the trypanosomes affecting domestic animals in Uganda come to be described.

The method of carrying out these experiments was always the same. The flies were fed for some days on a highly-infected monkey, whose blood on microscopical examination was seen to contain numerous trypanosomes of sleeping sickness, and afterwards on a series of healthy monkeys.

The following table gives the number of flies used in each experiment, the number of days they were fed on a monkey whose blood contained *T. gambiense*, the number of days which elapsed before the flies became infective, and the number of days the flies remained infective. The minus signs signify that the flies failed to become infected, or at least failed to infect; or, in other words, that the experiment was negative.

TABLE I.—DEVELOPMENT OF TRYPANOSOMA GAMBIENSE IN LAKE-SHORE GLOSSINA PALPALIS.

Experiment	Number of flies	Number of days fed on	Number of days before flies became infective	Number of days flies remained infective
654	60	3	—	—
656	280	3	—	—
663	60	2	18	75
676	500	3	29	47
721	50	3	—	—
980	350	3	—	—
986	100	2	19	35
987	50	2	40	51
989	50	2	45	45
1,020	100	3	—	—
1,023	50	3	37	51
1,026	70	3	34	48
1,198	20	40	—	—
1,372	100	3	—	—

Of these 14 experiments, seven are positive and seven negative. In the positive experiments 880 flies were used, an average of 126; in the negative 960, an average of 137. The shortest time which elapsed before a fly became infective was 18 days, the longest 45 days, and the average 32 days.

It may be well to give some of these experiments more in detail in order to show the methods used, and draw attention to various interesting points.

#### Experiment 624.

To ascertain if development of *T. gambiense* takes place in the alimentary canal of wild or Lake-shore *G. palpalis*.

March 31st, 1909.—Two batches of *G. palpalis*, caught on the Lake-shore, consisting of 30 flies in each batch, were fed to-day on a monkey whose blood contained numbers of *T. gambiense*.

The following table gives the principal details of the experiment:

Date	Day of experiment	Procedure	Result		Remarks
			Positive	Negative	
1909					
Mar. 31 ..	—	Flies fed on infected monkey			
Apr. 1 ..	1	„ „			
„ 2 ..	2	„ „			
„ 3-4	3-4	Flies starved 72 hours			
„ 5-8	5-8	Flies fed on healthy monkey, 657		—	
„ 9-12	9-12	Flies fed on healthy monkey, 677		—	
„ 13 ..	13	Flies fed on healthy monkey, 702		—	
„ 14 ..	14	Flies fed on healthy monkey, 703		—	
„ 15 ..	15	Flies fed on healthy monkey, 704		—	
„ 16 ..	16	Flies fed on healthy monkey, 705		—	
„ 17-21	17-21	Flies fed on healthy monkey, 706			
„ 22 to May 22	22-52	Flies fed on healthy monkey, 728			

*Remarks.*—These 60 Lake-shore or wild flies, although fed on an infected monkey for three days, failed to convey the infection to healthy monkeys. As the flies died they were dissected. Only in one were flagellates found, and these appeared to be of the *Trypanosoma grayi* type. An emulsion was made of the contents of the alimentary canal of this fly, and injected into monkey 914. Monkey 914 never showed trypanosomes in its blood, although kept under observation for a month.

*Experiment 656.*

Date	Day of experiment	Procedure	Result		Remarks
			Positive	Negative	
1909					
Apr. 3-5	1-2	280 flies fed on infected monkey			
„ 6-7	3-4	Flies starved 72 hours			
„ 8-17	5-14	Flies fed on healthy monkey, 675		—	
„ 18 ..	15	Flies fed on healthy monkey, 712		—	
„ 19 ..	16	Flies fed on healthy monkey, 713		—	
„ 20 ..	17	Flies fed on healthy monkey, 714		—	
„ 21 ..	18	Flies fed on healthy monkey, 715		—	
„ 22-25	19-22	Flies fed on healthy monkey, 716		—	
„ 26-28	23-25	Flies starved ..			
„ 29 to June 17	26-75	Flies fed on healthy monkey, 744		—	June 8, 8 flies alive. „ 18, 2 „ „

*Remarks.*—Two hundred and eighty wild tsetse flies, fed for three days on an infected monkey, and then on healthy monkeys, failed to transfer the disease. The experiment lasted from April 3rd to June 17th, and seven healthy monkeys were used. After 66 days eight flies remained alive; after 75 days only two. None of the flies which died, or were killed and dissected, showed flagellates in the alimentary canal.

*Experiment 663.*

This is the experiment described at length in the "Proceedings" (B, vol. 81, 1909). Sixty wild flies were used. One fly became infective after 18 days, and remained infective 75 days, when it died. A small quantity of fluid from the gut of this fly injected into a healthy monkey gave rise to sleeping sickness.

*Experiment 676.*

Date	Day of experiment	Procedure	RESULT		Remarks
			Positive	Negative	
1909					
Apr. 6-8	1-2	500 Lake-shore flies fed on infected monkey			
" 9-10	3-4	Flies starved			
" 11-16	5-10	Flies fed on healthy monkey, 696		-	
" 17-18	11-12	Flies fed on healthy monkey, 707		-	
" 19-20	13-14	Flies fed on healthy monkey, 708		-	
" 21	15	Flies fed on healthy monkey, 709		-	
" 22	16	Flies fed on healthy monkey, 710		-	
" 23 to May 12	17-36	Flies fed on healthy monkey, 711	+		April 23, 67 flies alive.
May 13-14	37-38	Flies starved			
" 15-16	39-40	Flies fed on healthy monkey, 766	+		
" 17-21	41-45	Flies fed on healthy monkey, 770	+		
" 22-23	46-47	Flies starved			
" 24-28	48-52	Flies fed on healthy monkey, 901		-	May 23, 22 flies alive. Infected fly found.
" 29-30	53-54	Flies starved			
" 31 to June 3	55-58	Flies fed on healthy monkey, 941		-	June 3, 1 fly alive.

*Remarks.*—Five hundred Lake-shore tsetse flies were fed for three days on an infected monkey. As none of the five healthy monkeys on which these flies were fed during the first 15 days showed any sign of sleeping sickness it may be assumed that there was no naturally-infected fly among the 500. On or about the 29th day the cage of flies became infective, and remained infective up to the 47th day. On this day a dead fly was found on dissection to contain flagellates, and after the death of this fly no further infection took place. The injection of the infected fly failed, however, to give rise to sleeping sickness when injected under the skin of a healthy monkey.

*Experiment 721.*

*Remarks.*—The experiment lasted from April 12th to July 6th, a period of 85 days, and remained negative throughout. On the 30th day, 12 flies out of the 50 remained alive; on the 73rd day only six flies were left. As the flies died they were dissected, but no infected fly was found.

*Experiment 980.*

*Remarks.*—This experiment lasted 66 days, and remained negative. At the end 15 flies remained alive. These were killed and dissected. All proved negative.

These experiments on the development of *Trypanosoma gambiense* in Lake-shore or wild *Glossina palpalis*, given somewhat in detail, will suffice to show the method employed, and make it unnecessary to explain the remaining experiments further than is done in Table I.

It would appear from the fact that none of the healthy monkeys became infected before the 18th day, that not a single fly of the 1,840 used was infective when captured. That is to say, that among nearly 2,000 Lake-shore flies, not one was naturally infected. On referring to Table IV., in the previous paper in the "Proceedings"—a table showing the probable number of naturally-infected flies—this is seen to be by no means exceptional.

Other points of interest arising out of these experiments are the number of flies which became infective, and the result of injecting their body-contents into healthy animals.

The following table shows this :—

TABLE II.—NUMBER OF FLIES FOUND INFECTED WITH TRYPANOSOMES IN THE EXPERIMENTS WITH LAKE-SHORE FLIES AND TRYPANOSOMA GAMBIENSE.

Experiment	Number of flies used	Experiment, positive or negative	Number of infected flies found	Result of injection of infected flies	Remarks
624	60	-	1	Negative	<i>T. grayi</i> type
656	240	-	0		
663	60	-	1	Positive	
676	500	-	1	Negative	
721	50	-	0		
980	350	-	0		
986	100	+	1	Not injected	
987	50	+	2	Negative	1 <i>T. gambiense</i> and 1 <i>T. grayi</i> type
989	50	+	1	Negative	
1,020	100	-	0		
1,023	50	-	5	2 positive, 3 negative	
1,026	70	-	4	3 positive, 1 negative	
1,198	20	-	0		
1,372	100	-	0		

Thus it is seen that the infected flies found in three of the positive experiments, when injected into healthy monkeys gave negative results, while those found in three others gave positive results. The infected fly found in the seventh successful experiment was not injected.

It is difficult to understand why the results of injecting infected flies into healthy animals are so irregular. The only theory brought forward is that the trypanosomes introduced under the skin along with the tissues of the fly may give rise to a reaction at that point, which will so damage the parasites that they fail to infect.

In these experiments, 1,840 flies were used, and of these 16 became infected, or, at least, were found to have flagellates in their gut. This works out at less than 1 per cent. The smallness of the percentage is due to the fact that less care was taken to dissect the flies which died during the course of the experiments.

B.—THE DEVELOPMENT OF *TRYPANOSOMA GAMBIENSE* IN  
LABORATORY-BRED *GLOSSINA PALPALIS*.

The pupæ of the fly were found on the Lake-shore, and hatched out in the laboratory. For a long time the Commission failed to find any pupæ, although days were spent in turning over soil and decaying vegetable matter in those places where the fly most abounded. At last, Lieutenant A. D. Fraser, Royal Army Medical Corps, found them in numbers in patches of sand on the edge of the Lake in the Sesse Islands. After the Sesse Islands were emptied of their inhabitants, Fraser's native collectors came into the service of the Commission, and from that time there was no lack of pupæ. These natives found them in large numbers. One day they brought up as many as 7,000. These pupæ proved to be much healthier than those obtained from flies in captivity. The flies bred from larvæ born in the laboratory rarely showed any marked vitality. Many of the larvæ were immature, and those which hatched out were rarely a success as experimental flies. On the other hand, the flies hatched out from pupæ found on the Lake-shore were fairly strong and vigorous, and lived in captivity for a couple of months or more. It was, however, difficult to get them to feed at first, and very few became infective, as the following table shows. The flies were fed chiefly on infected monkeys. In one negative experiment (1,431) they were fed on a case of sleeping sickness in man, and in five—two positive (1,566 and 1,602) and three negative (1,269, 1,452, and 1,672)—on oxen. Numerous observations went to show that there is no hereditary transmission of trypanosomes in *Glossina palpalis*; and no evidence was gained that the flies became infected with any flagellate by contact with other flies or fouled cages. Any trypanosomes found in laboratory-bred flies may therefore be considered to be derived from the infected animal they had fed upon.

TABLE III.—DEVELOPMENT OF *Trypanosoma gambiense* IN LABORATORY-BRED *Glossina palpalis*.

Experiment	Number of flies	Number of days fed on	Number of days before flies became infective	Number of days flies remained infective
725	8	3	—	—
733	8	3	—	—
750	15	6	—	—
768	9	5	—	—
858	9	8	—	—
915	6	10	—	—
947	9	5	—	—
975	16	5	34	49
991	27	6	—	—
1,266	11	12	—	—
1,269	22	7	—	—
1,368	14	12	—	—
1,397	7	19	—	—
1,428	50	6	—	—
1,431	30	20	—	—
1,452	90	10	—	—
1,549	50	4	37	46
1,558	60	4	—	—
1,559	50	4	—	—
1,566	35	4	53	53
1,602	50	4	27	27
1,604	35	12	—	—
1,640	40	10	—	—
1,651	60	4	41	41
1,664	50	12	—	—
1,665	50	12	—	—
1,671	45	12	—	—
1,672	28	12	—	—
1,680	45	4	—	—
1,686	60	3	—	—
1,688	60	3	—	—
1,693	50	4	—	—
1,706	60	7	—	—
1,712	50	12	32	32
1,758	50	3	—	—
1,760	60	4	29	29
1,761	50	4	38	38
1,769	60	3	—	—
1,801	70	12	—	—
1,802	75	12	—	—
1,860	60	12	—	—
1,868	60	12	—	—

Among these 42 experiments there were only eight positive, while there were as many as thirty-four negative. In the eight positive experiments, 371 flies were used, an average of 46; in the 34 negative experiments, 1,323 flies, an average of 40. The shortest time which elapsed before a laboratory-bred fly became infected with *Trypanosoma gambiense* was 27 days, the longest 53 days, and the average 36 days.

# 430 *The Development of Trypanosomes in Tsetse Flies*

Here follow the experiments, given somewhat more in detail, which gave positive results :—

## *Experiment 975.*

To ascertain if any development of *T. gambiense* takes place in the alimentary canal of laboratory-bred *G. palpalis*.

The following table gives the principal details of the experiment :—

Date	Day of experiment	Procedure	Result		Remarks
			Positive	Negative	
1909 June 8-12	1-4	Flies fed on infected monkey			16 flies used.
" 13-15	5-7	Flies starved ..			
" 16 to July 19	8-41	Flies fed on healthy monkey, 1008	+		
July 20-21	42-43	Flies starved ..			Aug. 4, 12 remaining flies killed and dissected.
" 22 to Aug. 3	44-55	Flies fed on healthy monkey, 1371	+		

*Remarks.*—Sixteen laboratory-bred flies were fed on infected monkeys for five days. Thirty-four days after their first feed they became infective, and remained so for at least 49 days. On the 56th day the remaining 12 flies were dissected and examined for flagellates. None were found, but the contents of the alimentary canals of the 12 flies, pooled and injected into a healthy monkey, gave rise to sleeping sickness.

## *Experiment 1549.*

Date	Day of experiment	Procedure	Result		Remarks
			Positive	Negative	
1909 Aug. 23-27	1-4	Flies fed on heavily-infected monkey			50 flies used.
" 28-29	5-6	Flies starved ..			
" 30 to Oct. 5	7-43	Flies fed on healthy monkey, 1617	+		Oct. 8, 20 remaining flies dissected, 4 found infected
Oct. 6-7	44-45	Flies starved ..			

*Remarks.*—Fifty laboratory-fed flies were fed on an infected monkey daily for five days. Thirty-seven days after their first feed they became infective. Twenty flies remained alive on the 46th day, and on dissection four were found infected with flagellates. A drop of fluid from the alimentary canals of two of these infected flies injected into a monkey gave rise to sleeping sickness.

## Experiment 1566.

Date	Day of experiment	Procedure	RESULT		Remarks
			Positive	Negative	
1909 Aug. 29 to Sept. 1	1-3	Flies fed daily on infected ox			35 flies used
Sept. 2-3	4-5	Flies starved ..			
„ 4 to Oct. 19	6-51	Flies fed on healthy monkey, 1566	+		Oct. 21, 20 remaining flies killed and dissected; 9 found infected
Oct. 20 ..	52	Flies starved ..			

*Remarks.*—Thirty-five laboratory-bred flies were fed daily for four days on an ox infected with *Trypanosoma gambiense*. Fifty-three days after their first feed the flies became infective. Nine of the 20 remaining flies, when dissected, showed infection with flagellates: three of these had infection of the proboscis. The contents of the alimentary canal of one infected fly injected into a monkey and goat gave negative results, as also did the probosces of two infected flies when injected into a goat.

## Experiment 1602.

Date	Day of experiment	Procedure	RESULT		Remarks
			Positive	Negative	
1909 Sept. 1-4	1-3	Flies fed on infected ox daily			50 flies used
„ 5-6	4-5	Flies starved ..			
„ 7-14	6-13	Flies fed on healthy monkey, 1620		—	
„ 15-20	14-19	Flies fed alternately, daily, on healthy monkey, 1620, and goat, 1690		—	
„ 21-29	20-28	Flies fed alternately, daily, on healthy monkey, 1703, and goat, 1690	1703 +	1690 —	Sept. 29, 32 remaining flies killed by accident and dissected; 5 found infected

*Remarks.*—Fifty laboratory-bred flies were fed daily for four days on an infected ox, as in the previous experiment. From the 15th to the 28th day the flies were fed alternately on a monkey and goat. Twenty-seven days after their first feed the flies infected monkey 1703 with sleeping sickness. Five of the 32 remaining flies showed infection with flagellates, and one of these injected into a monkey gave rise to sleeping sickness.

432 *The Development of Trypanosomes in Tsetse Flies**Experiment 1651.*

Date	Day of experiment	Procedure	Result		Remarks
			Positive	Negative	
1909 Sept. 11--14	1-3	Flies fed on infected monkey			60 flies used
„ 15-16	4-5	Flies starved ..			Monkey 1651 died on 13th day
„ 17-24	6-13	Flies fed on healthy monkey, 1651		-	Nov. 1, 32 remaining flies killed and dissected; 4 found infected
„ 25 to Oct. 29	14-48	Flies fed on healthy monkey, 1720	+		
Oct. 30-31	49-50	Flies starved ..			

*Remarks.*—Sixty laboratory-bred flies were fed daily for four days on an infected monkey. Forty-one days after their first infected feed they became infective. Four flies infected with flagellates were found among the 32 which remained alive on the 51st day. They were not injected into animals.

*Experiment 1712.*

Date	Day of experiment	Procedure	Result		Remarks
			Positive	Negative	
1909 Sept. 23 to Oct. 5	1-12	Flies fed on infected monkey			50 flies used
Oct. 6-7	13-14	Flies starved ..			Nov. 4, 31 remaining flies killed and dissected, 1 found infected
„ 8 to Nov. 2	15-40	Flies fed on healthy monkey, 1790	+		
Nov. 3 ..	41	Flies starved ..			

*Remarks.*—Fifty laboratory-bred flies were fed daily for 13 days on an infected monkey. The flies became infective 32 days after their first feed. On dissection of the remaining 31 flies on the 41st day, one was found to be infected with flagellates, but it did not give rise to the disease when injected into a healthy monkey.

*Experiment 1760.*

Date	Day of experiment	Procedure	Result		Remarks
			Positive	Negative	
1909 Oct. 1-5 ..	1-4	Flies fed on infected monkey			60 flies used
„ 6-7 ..	5-6	Flies starved ..			Nov. 4, 1 infected fly injected into healthy monkey
„ 8 to Nov. 6	7-36	Flies fed on healthy monkey, 1760	+		Nov. 8, 28 remaining flies killed and dissected; all negative
Nov. 7 ..	37	Flies starved ..			

*Remarks.*—Sixty laboratory-bred flies were fed daily for five days on an infected monkey. They became infective on the 29th day. On the 34th day one fly which had died was found to be infected with flagellates, but on injection into a monkey it failed to give rise to sleeping sickness. No infected flies were found among the 28 remaining alive on the 38th day, when they were dissected.

*Experiment 1761.*

Date	Day of experiment	Procedure	Result		Remarks
			Positive	Negative	
1909 Oct. 1-5 ..	1-4	Flies fed on infected monkey			50 flies used
„ 6-7 ..	5-6	Flies starved			
„ 8 to Nov. 8	7-38	Flies fed on healthy monkey, 1761	+		Nov. 11, 31 remaining flies killed and dissected; all negative
Nov. 9-10	39-40	Flies starved			

*Remarks.*—Fifty laboratory-bred flies were fed daily for five days on an infected monkey. They became infected on the 38th day. No infected flies were found among the 31 remaining alive on the 41st day, when they were dissected.

TABLE IV.—NUMBER OF FLIES FOUND INFECTED WITH *TRYPANOSOMA GAMBIENSE* IN THE EXPERIMENTS WITH LABORATORY-BRED FLIES.

Experiment	Number of flies used	Experiment, positive or negative	Number of infected flies found	Result of injection of infected flies	Remarks
975	16	+	0	Positive	12 remaining flies pooled
1269	22	—	2	Negative	
1452	90	—	1	„	
1549	50	+	4	Positive	
1566	35	+	9	Negative	1 fly injected
1602	50	+	5	Positive	
1651	60	+	4		Flies not injected
1672	28	—	2	Negative	
1680	45	—	1	„	
1693	50	—	2	„	
1706	60	—	4	„	
1712	50	+	1	„	
1760	60	+	1	„	
1769	60	—	2	Positive	
1801	70	—	1		Fly not injected

There are some curious results to be noted here. In Experiment 975 the twelve remaining flies were dissected and examined. None was found infected. They were then pooled and injected

into a healthy monkey, which became infected with sleeping sickness. This shows that the infected fly may escape detection by the microscope.

In Experiments 1269, 1452, 1672, 1680, 1693, and 1706, flies were found containing flagellates. These flies had not given rise to disease in the monkey they had been fed on, nor did their injection prove successful. The flagellates must be considered to be *Trypanosoma gambiense*, and therefore a cage of flies may become infected without causing disease either by biting or injection.

In Experiments 1549 and 1602, flies were found containing flagellates, and these flies succeeded in infecting monkeys both by biting while alive and injection after death.

Lastly, in Experiments 1566, 1712, and 1760, flies were found with flagellates which had infected the monkey fed on, but which failed to give rise to disease when their body-contents were injected into healthy animals.

In these experiments 746 laboratory-bred flies were used. Thirty-nine became infected—that is to say, more than 5 per cent.

#### C.—THE DEVELOPMENT OF *TRYPANOSOMA DIMORPHON* IN LAKE-SHORE *GLOSSINA PALPALIS*.

This is the commonest cattle trypanosome in Uganda. During 1909 it caused epidemics among the Government transport oxen at Entebbe, Mr. Walsh's cattle at Kabula Muliro, and the Uganda Company's cattle at Namukekera, all of which were investigated by the Commission.

The name *Trypanosoma dimorphon* is used for this species, although two forms have not been found. It belongs to the short, stumpy type of trypanosomes, without free flagella, and is probably identical with that found in Zanzibar by Edington; in Portuguese East Africa, described by Theiler; in Northern Rhodesia by Montgomery and Kinghorn; and in Southern Rhodesia by Bevan.

TABLE V.—DEVELOPMENT OF *TRYPANOSOMA DIMORPHON* IN LAKE-SHORE *GLOSSINA PALPALIS*.

Experiment	Number of flies	Number of days fed on	Number of days before flies became infective	Number of days flies remained infective
574	500	3	21	21
996	100	3	—	—
1010	120	3	—	—
1022	100	3	—	—

Only one experiment out of four was successful. The flies became infective 21 days after their first feed on the infected dog.

*Experiment 574.*

Date	Day of experiment	Procedure	RESULT		Remarks
			Positive	Negative	
1909 Mar. 4 - 6..	1-2	Flies fed on infected dog			500 flies used.
„ 7-25	3- 21	Flies fed on a fowl	+		
„ 26-30	22-26	Flies fed on healthy monkey, 649			
„ 31-	27-30	Flies fed on healthy monkey, 650		-	March 25, 120 flies alive.
Apr. 3	31-35	Flies fed on healthy monkey, 660		-	April 14, 60 flies alive.
„ 4-8..	36-40	Flies fed on healthy monkey, 678		-	May 3, 30 flies alive.
„ 9-13	41-70	Flies fed on healthy monkey, 723		-	May 14, 22 remaining flies dissected; all negative.
„ 14 - May 18					

*Remarks.*—Five hundred wild flies were fed for three days on a dog whose blood contained numerous *Trypanosoma dimorphon*. Twenty-one days after their first feed they became infective. By the 27th day they lost the infection and did not regain it, although kept under observation for 71 days. None of the flies which died or were killed and dissected showed any flagellates. It appears as if the infected fly had died early in the experiment and had escaped notice.

D.—THE DEVELOPMENT OF *TRYPANOSOMA DIMORPHON*  
IN LABORATORY-BRED *GLOSSINA PALPALIS*.

TABLE VI.—DEVELOPMENT OF *TRYPANOSOMA DIMORPHON* IN LABORATORY-BRED *GLOSSINA PALPALIS*.

Experiment	Number of flies	Number of days fed on	Number of days before flies became infective	Number of days flies remained infective
1642	50	4	14	14
1675	50	3	—	—
1676	50	3	—	—
1843	140	4	—	—

Four experiments were carried out, as in the Lake-shore group, and one also was successful. The flies became infective on or about the 14th day.

# 436 *The Development of Trypanosomes in Tsetse Flies*

## *Experiment 1642.*

Date	Day of experiment	Procedure	RESULT		Remarks
			Positive	Negative	
1909					
Sept. 8—11	1—3	Flies fed on infected oxen			50 flies used.
„ 12—13	4—5	Flies starved			
„ 14—28	6—20	Flies fed on healthy ox, 870	+		
„ 29	21	Flies starved			
„ 30—	22—33	Flies fed on healthy monkey, 1741		—	Oct. 13, 35 remaining flies dissected; all negative.
Oct. 11					
Oct. 12	34	Flies starved			

*Remarks.*—Fifty laboratory-bred flies were fed on two infected oxen for four days, and then on a healthy ox. Fourteen days after their first infected feed this ox took the disease.

These experiments with *Trypanosoma dimorphon* are not very satisfactory. Experiment 574 appears to be fairly free from fallacy, and from it, it would seem probable that *Trypanosoma dimorphon* can develop in *Glossina palpalis* and infect a healthy animal after a period of 21 days. Ox 870, in Experiment 1642, became infected at a time when several of the cattle at Mpumu became naturally infected with this trypanosome disease, so that this experiment is not free from doubt. It is evident that more work must be done before anything definite can be said regarding this species.

## E.—THE DEVELOPMENT OF TRYPANOSOMA VIVAX IN LAKE-SHORE GLOSSINA PALPALIS.

TABLE VII. —DEVELOPMENT OF TRYPANOSOMA VIVAX IN LAKE-SHORE GLOSSINA PALPALIS.

Experiment	Number of flies	Number of days fed on	Number of days before flies became infective	Number of days flies remained infective
997	60	4	11	48
998	45	4	11	44
1014	200	4	21	60?

As *Trypanosoma vivax* does not affect monkeys, naturally cattle or goats were used in these experiments. The three experiments with Lake-shore flies were all successful; two became infected in 11 days, and one in 21 days.

Here follow the experiments in detail:—

*Experiment 997.*

Date	Day of experiment	Procedure	RESULT		Remarks
			Positive	Negative	
1909 June 15-18	1-3	Flies fed on infected goat			60 flies used
" 19-20	4-5	Flies starved ..			
" 21 to July 3	6-18	Flies fed on healthy calf, 1030	+		
July 4-5	19-20	Flies starved ..			July 6, injected infected fly into goat; negative
" 6-21	21-36	Flies fed on healthy bull 1268	+		Aug. 10, remaining flies dissected. Infected fly injected into goat; negative
" 22-23	37-38	Flies starved ..			
" 24 to Aug. 10	39-56	Flies fed on healthy calf, 737	-		

*Remarks.*—Sixty wild flies were fed for four days on a goat infected with *Trypanosoma vivax*. Eleven days after their first feed they became infective, and remained so during the experiment. Two flies were found infected with flagellates, one on the 21st day, and one on the 56th day, both of which when injected into goats failed to give rise to the disease.

*Experiment 998.*

Date	Day of experiment	Procedure	RESULT		Remarks
			Positive	Negative	
1909 June 15-18	1-3	Flies fed on infected goat			45 flies used
" 19-20	4-5	Flies starved ..			
" 21 to July 3	6-18	Flies fed on healthy calf, 1030	+		Aug. 6, pooled contents of 14 flies remaining; injected into goat, which became infected with <i>T. vivax</i>
July 4-5	19-20	Flies starved ..			
" 6 to Aug. 5	21-51	Flies fed on healthy calf, 1267	+		

*Remarks.*—Forty-five wild flies were fed for four days on an infected goat. Eleven days after their first feed they became infective, and remained so during the experiment. The pooled contents of the 14 remaining flies injected into a goat on the fifty-second day gave rise to infection with *Trypanosoma vivax*.

*Experiment 1014.*

Date	Day of experiment	Procedure	Result		Remarks
			Positive	Negative	
1909 June 18—22	1—4	Flies fed on infected goat			200 flies used
„ 23—24	5—6	Flies starved ..			July 26, injected infected fly into a goat and monkey, the former of which became infected Aug. 4, 17 remaining flies dissected; all negative
„ 25 to July 17	7—29	Flies fed on healthy goat, 1079	+		
July 18	30	Flies starved ..			
„ 19 to Aug. 3	31—46	Flies fed on healthy goat, 1344	+		

*Remarks.*—Two hundred wild flies were fed for five days on an infected goat. Twenty-one days after their first feed they became infective, and remained so during the experiment. On the 38th day one infected fly was found, which on injection into a goat and a monkey gave rise to *Trypanosoma vivax* infection in the former animal. Seventeen flies remained alive at the end of the experiment, and were killed and dissected. None of them was found to harbour flagellates.

TABLE VIII.—NUMBER OF FLIES FOUND INFECTED WITH TRYPANOSOMES IN THE EXPERIMENTS WITH LAKE-SHORE FLIES AND *TRYPANOSOMA VIVAX*.

Experiment	Number of flies used	Experiment, positive or negative	Number of infected flies found	Result of injection of infected flies	Remarks
997	60	+	2	—	
998	45	+	2	+	14 flies remaining pooled
1014	200	+	1	+	

Of the above three positive experiments it is seen that five infected flies were found. One of these—Experiment 1014—when injected into a susceptible animal gave rise to *Trypanosoma vivax* infection. In Experiment 998, among the 14 remaining flies, two were found with trypanosomes in their probosces. None of the 14 showed flagellates in the gut. The body-contents of the 14 flies, in addition to the contents of the two probosces, were pooled and injected into a goat, which 12 days afterwards showed *Trypanosoma vivax* in its blood.

F.—THE DEVELOPMENT OF *TRYPANOSOMA VIVAX* IN LABORATORY-BRED *GLOSSINA PALPALIS*.TABLE IX.—DEVELOPMENT OF *TRYPANOSOMA VIVAX* IN LABORATORY-BRED *GLOSSINA PALPALIS*.

Experiment	Number of flies	Number of days fed on	Number of days before flies became infective	Number of days flies remained infective
1591	50	4	21	21
1638	25	6	—	—
1638	68	4	35	35
1700	60	4	30	30
1870	50	?	—	—

Five experiments were made with laboratory-bred flies. Three were successful.

*Experiment 1591.*

Date	Day of experiment	Procedure	RESULT		Remarks
			Positive	Negative	
1909 Sept. 2-4	1-2	Flies fed on infected calf, 1318			50 flies used
" 5-6	3-4	Flies starved ..			
" 7	5	Flies fed on infected calf, 1318			
" 8-9	6-7	Flies starved ..			Oct. 4, 35 remaining flies dissected, negative except 3, which had infected probosces
" 10-30	8-28	Flies fed on healthy goat, 1652	+		
Oct. 1-3	29-31	Flies starved ..			

*Remarks.*—Fifty laboratory-bred flies were fed for four days on an infected calf; 21 days after their first feed they became infective; 35 flies remained alive on the 32nd day. On these being dissected three were found with infected probosces. These probosces were not injected into animals, so that it is not known if the flagellates were infective by injection.

*Experiment 1638.*

Date	Day of experiment	Procedure	RESULT		Remarks
			Positive	Negative	
1909 Sept. 6-11	1-5	Flies fed on infected calf			25 flies used
" 12-13	6-7	Flies starved ..			Sept. 29, 23 remaining flies accidentally killed; negative on dissection
" 14-29	8-23	Flies fed on healthy goat, 1682		—	

## 440 *The Development of Trypanosomes in Tsetse Flies*

*Remarks.*—Twenty-five laboratory-bred flies were fed for six days on a calf infected with *Trypanosoma vivax*, and afterwards for 16 days on a healthy goat. This goat was not infected, and the remaining 23 flies when killed and dissected all proved negative.

### *Experiment 1698.*

Date	Day of experiment	Procedure	Result		Remarks
			Positive	Negative	
1909 Sept. 21--24	1-3	Flies fed on infected ox			68 flies used Calf 1893 died 29.11.09
„ 25--26	4-5	Flies starved ..			
„ 27 to Nov. 5	6-45	Flies fed on healthy ox, 425	+		Nov. 12, 53 flies remaining alive dissected; probosces of 5 swarming with flagellates
Nov. 6-9	46-49	Flies fed on healthy calf, 1893		-	
„ 10--11	50-51	Flies starved ..			

*Remarks.*—Sixty-eight laboratory-bred flies were fed for four days on an ox whose blood contained *Trypanosoma vivax*. About the 35th day the flies became infective. On the 52nd day the 53 flies which remained alive were killed and dissected. The probosces of five, three males and two females, were found to be swarming with flagellates. These were not injected into animals.

### *Experiment 1700.*

Date	Day of experiment	Procedure	Result		Remarks
			Positive	Negative	
1909 Sept. 21--24	1-3	Flies fed on infected ox			60 flies used
„ 25--26	4-5	Flies starved ..			
„ 27 to Oct. 28	6-37	Flies fed on healthy calf, 290	+		Oct. 30, 38 remaining flies dissected; 22 found infected

*Remarks.*—Sixty laboratory-bred flies were fed for four days on an ox whose blood contained *Trypanosoma vivax*. About the 30th day these flies became infective. On the 39th day the 38 remaining flies were killed and dissected. There were 19 males and 19 females; 22 showed infection of the proboscis with crithidia-like flagellates. Only one fly showed flagellates in the gut. Of the 22 flies which had trypanosomes in the proboscis, 9 were males and 13 were females; 10 of the infected probosces were ground up in salt solution and injected into an ox; 12 days afterwards trypanosomes appeared in the blood of this ox.

*Experiment 1870.*

*Remarks.*—Fifty laboratory-bred flies were fed on a calf whose blood contained *Trypanosoma vivax*; 10 and 12 days afterwards all the flies were killed and dissected. No flagellates were found in any part of the flies.

TABLE X. —NUMBER OF FLIES FOUND INFECTED WITH TRYPANOSOMES IN THE EXPERIMENTS WITH LABORATORY-BRED FLIES AND TRYPANOSOMA VIVAX.

Experiment	Number of flies used	Experiment, positive or negative	Number of infected flies found	Result of injection of infected flies	Remarks
1591	50	+	3	Not injected	Probosces infected
1698	68	-	5	"	" "
1700	60	+	22	+	" "

In these experiments 178 flies were used, and of these thirty or 17 per cent., became infected. A curious fact is that in all the thirty flies, with the exception of one, the infection was confined to the proboscis. There was a feeling in the minds of the members of the Commission that this growth of flagellates in the proboscis was something quite characteristic of *T. vivax*. Only on one occasion was this development of trypanosomes in the proboscis seen after feeding laboratory-bred flies on blood which was known to contain nothing but *T. gambiense*.

#### G.—THE DEVELOPMENT OF TRYPANOSOMA NANUM IN LAKE-SHORE GLOSSINA PALPALIS.

TABLE XI. THE DEVELOPMENT OF TRYPANOSOMA NANUM IN LAKE-SHORE GLOSSINA PALPALIS.

Experiment	Number of flies	Number of days fed on	Number of days before flies became infective	Number of days flies remained infective
1,035	120	3	3	3

Only one experiment was carried out with *T. nanum* and Lake-shore *G. palpalis*. It is unsatisfactory, as trypanosomes appeared in the first healthy goat a few days after the fly had fed on the infected animal. None of the flies which were dissected showed any flagellates in their alimentary canal.

442 *The Development of Trypanosomes in Tsetse Flies**Experiment 1035.*

Date	Day of experiment	Procedure	RESULT		Remarks
			Positive	Negative	
1909 June 21—23	1—2	Flies fed on infected goat	+		120 flies used
„ 24—25	3—4	Flies starved			
„ 26 to July 1	5—10	Flies fed on healthy goat, 1171			
July 2—4	11—13	Flies starved			
„ 5 to Aug. 2	14—42	Flies fed on healthy goats, 1257 and 1258			Aug. 3, goat 1257 died; negative Aug. 25, 9 remaining flies dissected; negative
Aug. 3—24	43—64	Flies fed on goat, 1258		—	

*Remarks.*—One hundred and twenty wild flies were fed for three days on an infected goat. Five days after their first feed they infected a healthy goat, or, at least, trypanosomes resembling *T. nanum* appeared in the blood. They failed to infect other healthy goats, although they were fed up to the sixty-fourth day after their first infected feed. Nine remaining flies dissected on the sixty-fifth day were negative for flagellates.

H.—THE DEVELOPMENT OF *TRYPANOSOMA NANUM* IN LABORATORY-BRED *GLOSSINA PALPALIS*.TABLE XII.—THE DEVELOPMENT OF *TRYPANOSOMA NANUM* IN LABORATORY-BRED *GLOSSINA PALPALIS*

Experiment	Number of flies	Number of days fed on	Number of days before flies became infective	Number of days flies remained infective
1738	100	3	—	—

Only one experiment was carried out with laboratory-bred flies. The result was negative.

*Experiment 1738.*

*Remarks.*—One hundred laboratory-bred flies were fed for three days on an ox whose blood contained *T. nanum*, and then on a healthy goat for forty days. This goat remained healthy, and all the flies when dissected were found free from flagellates.

A few experiments were made by the Commission on the

development of *T. brucei* and *T. cazalboui* in the sleeping sickness tsetse fly, *G. palpalis*, but they came to nothing.

#### CONCLUSIONS.

(1) That *T. gambiense* multiplies in the gut of about one in twenty *G. palpalis* which have fed on an infected animal.

(2) That the flies become infective, on an average, thirty-four days after their first feed.

(3) That a fly may remain infective for seventy-five days.

(4) That *T. dimorphon*, *T. vivax*, and *T. nanum* may also multiply in *G. palpalis*, which must therefore be looked upon as a possible carrier in these diseases.

(5) That multiplication in the tube of the proboscis is characteristic of *T. vivax*.

OBSERVATIONS ON HUMAN SPIROCHÆTOSIS IN THE  
SUDAN.

BY CAPTAIN L. BOUSFIELD,  
*Royal Army Medical Corps.*

ACCORDING to Sandwith this disease has been found in Sudanese, but apparently only in Sudanese resident in Egypt.

Lately, however, two cases were reported at El Obeid by Captain A. B. Cummins in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, February 1910, both occurring in Egyptian soldiers who had just returned off leave; unfortunately, their previous medical histories while on leave are not related, so that one does not know if they had previous attacks.

Another case has been found at the Civil Hospital, Khartoum, apparently imported from Egypt, and six cases have now occurred amongst the soldiers at Khartoum, the infection undoubtedly coming from Egypt, probably from a village, Ashmun Gurice, in the Mudiria of Manufia. Captain R. C. Anderson, R.A.M.C., made inquiries in Cairo, and found there was an epidemic of relapsing fever in a village close at hand, Kafr El Gazzar.

It seems scarcely possible that relapsing fever could have been missed in the more civilised parts of the Northern Sudan, and it is possible the disease does not exist there, and that all the cases have been imported. Five of the military cases occurred amongst recruits who came up from Egypt, arriving in Khartoum on January 1st, 1910, and all belonged to the 7th Battalion; the only other person to contract the disease was a soldier who worked in the pack store, and his history appears to help in elucidating the probable carrier, a point still in doubt with regard to some forms of human spirochætosis. It strongly supports the view that the *Pediculus vestimenti* is the culprit.

The first patient was taken ill with fever in Cairo twelve days after joining from his village, apparently twenty-one days before arrival in Khartoum. This is of interest as apparently the recruit must have contracted the disease in his village, and therefore the incubation period was more than twelve days. Daniels and Wilkinson in their work state twelve hours to eight days for European relapsing fever, and also reproduce a table giving five to seven days as the incubation period.

This man occupied a common barrack room with the other recruits, and was ill two days with fever before reporting sick at the General Military Hospital, Abbassia, when he was admitted for six days and diagnosed as simple continued fever.

On discharge, he almost immediately started for Khartoum, and states he was ill with fever the whole way up; he was admitted to hospital the day after arrival, January 2nd, 1910.

On admission he had a rigor, and his temperature was 102° F.; blood films showed a few spirochaetes after a prolonged search.

The second patient was taken ill on January 3rd, the third on January 7th, the fourth and fifth on January 9th, and the last on January 14th; they, however, did not report sick at once, and were admitted on the following dates: January 5th, 10th (two), 12th, and 15th.

The first five occupied the same barrack room at Abbassia, where, they all stated, they were bitten by bed-bugs, but only No. 1 was taken ill.

On the journey up all occupied the same railway carriage, but on arrival at Khartoum no two occupied the same barrack room.

No *Pediculi capitis, corporis, or pubis* were found on any of the patients; but, unfortunately, before the diagnoses were made, their clothes were sterilised, following the general rule on admission, and so *Pediculi vestimentorum* were not found. However, on the clothes of five other recruits who had travelled up with them a considerable number was discovered.

Dr. Andrew Balfour, the Director of the Gordon College Research Laboratories, kindly examined bed-bugs (*Cimex lectularius*) taken from crevices in the walls, near where the infected men slept, but could find no spirochaetes on dissection; a dozen were placed in a jar with a young gerbil on the 14th, but on the 17th he reported the animal was still quite healthy.

During the periods of fever a monkey, two gerbils, one jerboa, and one chicken were inoculated with blood for Dr. Balfour, and on two occasions *Pediculi vestimentorum* were successfully fed on patients suffering from a relapse, and the results obtained will be recorded by him.

The importance of these cases lies in the fact that the only man, besides the recruits, to contract the disease was the pack-store keeper who issued new clothes to the troops, took the dirty ones and wrapped them in bags ready for washing, and lived and slept in the same room with these bags of dirty clothes prior to their being sent to the wash.

There is ample evidence that the recruits were bitten by bed-bugs in Abbassia, possibly on the way up as the Egyptian third-class railway carriages are said to harbour these pests, and again in the barrack rooms at Khartoum where the recruits were mingled with other soldiers. Thus, if *Cimex lectularius* carried the disease one would have expected others to contract it, but only those who came into intimate contact with infected persons, a circumstance bound to occur on a railway journey of several days' duration, or with clothes of such cases, contracted the disease.

Everyone of the patients denied previous attacks of fever when in this village.

Further, bed-bugs are rarely found on clothes, for they retire to their lairs before the dawn appears, while *Pediculi vestimentorum* have their homes in the linings, &c., of the garments. Thus the last case seems strikingly to uphold the view advanced by Mackie in India, Dreyer, Kirton, and Graham U. Smith in Egypt—that the pediculi are probably the usual carriers.

With reference to the transmission of the disease, Nuttall has shown that *Cimex lectularius* can convey the *S. recurrentis* from mouse to mouse and Schaudinn has found spirochætes persisting in bugs up to thirty days.

There is a record of a macacus monkey, having been successfully inoculated with *S. recurrentis* contained in an emulsion made from the contents of eight bugs, and dying of fever.

The above evidence shows that the bug can carry the European disease, but it has also been proved that an emulsion of the tissues of *Pediculi vestimentorum* can produce Algerian spirochæetosis in a *Macacus*, though the emulsion was found on microscopic examination to be free from spirochætes (Sergeant and Foley).

Mackie states that in London he found spirochætes persisting up to three days in 10 per cent. of the *Pediculi vestimentorum* from infected cases.

The flea is common in Egypt, but is not believed to carry the disease, and is practically unknown in the Sudan.

A few points dealing with the clinical side may be noted.

*Relapses*.—One case had no relapse, the temperature reached a higher point (107.4° F.) than in any of the others, and the fever lasted only two days.

Four cases had one relapse, and one had in all probability three relapses, though he was only seen at the end of his final attack of fever.

The following table gives the number of days of pyrexia and apyrexia :—

Case	Date of onset of illness	Days of pyrexia	Days of apyrexia	Days of pyrexia	Remarks
1	Dec. 11, 1909	1	No further fever	..	Recruit. Probably admitted on the last day of the third relapse
2	Jan. 3, 1910	8	2	6	Recruit
3	" 7, "	4	6	4	Recruit
4	" 9, "	2	No further fever	..	Recruit
5	" 9, "	4	9	5	Recruit
6	" 14, "	3	7	4	Last case—Pack-Store Keeper

Thus the duration of the first attack of fever varied from eight to two days, but that of the relapse was practically constant—five days.

*The fever* usually rapidly reached its maximum or thereabouts on the first day with morning remissions varying from  $1.5^{\circ}$  to  $5.4^{\circ}$  F. during the periods of fever; the termination in each case, except No. 2 was by crisis with marked diaphoresis; the temperature between and subsequent to the attacks was almost invariably sub-normal.

*The spleen* was enlarged in all cases, and in five was palpable, extending from  $\frac{1}{2}$  inch to 2 inches below the costal margin; in one the enlargement could only be detected by percussion. A considerable increase in size of the spleen was noted on several occasions during a relapse. All complained of pain in the splenic region, and two evinced very marked tenderness on palpation.

*The Liver* was not appreciably enlarged in any case, but was extremely tender and painful in two.

*Anæmia* was noted in five cases, to a very marked degree in two.

Vomiting occurred in two cases, a definite rigor in one, herpes labialis in one, epistaxis in two. Prostration and weakness was very evident in all, but none showed any symptoms giving rise to anxiety, and all, except No. 2, rapidly regained health.

All had the usual concomitants of fever—headache, backache, and white-furred tongue, while three complained of pain and tenderness over the tibia. Jaundice, diarrhoea, eye effections, and albuminuria were absent in all cases.\*

The lungs and heart were not affected, and the pulse-rate was never noted above 112. However, on one occasion, it was observed to rise from 64 to 92 on a morning when the temperature was  $96.5^{\circ}$  F.; but during the day a relapse occurred, the temperature

rising to  $104.4^{\circ}$  F.; in this case the rise in pulse rate foretold the onset of a relapse.

With reference to the spirochæte, Dr. Balfour will deal with it, and only a few points will be noted.

In the first case, probably the third relapse, very few were found, but in the others the spirochætes were numerous, and always found during a relapse, but not in the apyrexial periods.

Figures of 8, coils, and long spiral forms were observed, but by far the most numerous were the last-named, and my opinion, based on these few cases, is that the various appearances were due to the positions taken up by the spirochætes at the moment of fixation, and that figures of 8 and coils were more frequently seen in the thicker portions of the films.

In the apyrexial periods blood was examined on several occasions for intracorpuseular forms, but with no success.

The spirochætes, the morphology of which will be dealt with by Dr. Balfour, stained readily by Leishman's method and by the Giemsa stain, carbol fuchsin, carbol thionin blue, and Bismarck brown; Gram's stain was not applied.

My thanks are due to Mul. Awal Basili Eff. Susa for his help in carrying out observations on these cases, and for his energetic and capable assistance in the microscopical work.

Since finishing these notes two other cases have been admitted to the Egyptian Army General Hospital, Abbassia, and as they presented symptoms not encountered in the Khartoum cases a short account is attached :—

CASE 7.—A Nafar from the Khedival escort was taken ill with fever three days before admission. He had returned four days previously from leave from his village Saheet, Mudirieh Sohog, so that he probably contracted the disease there. On March 21st he was admitted with a temperature  $103^{\circ}$  F. in a lethargic condition, and he had lost the power of speech, though quite conscious, understanding all that was asked him. There were bronchitic rales and some diminution of breath sounds at the right base, his pulse was 116 and his respirations 28; a tentative diagnosis was made of incipient lobar pneumonia. His spleen and liver were not enlarged or tender. He had suffered from two attacks of fever, lasting six to seven days, during February, but had been well during the last month.

Next day his knee-jerks were absent, together with the cremasteric and abdominal reflexes, and there appeared also to be some slight rigidity of the neck and tenderness over the spine, but

Kernig's sign was absent. However, as there had been recent cases of epidemic cerebro-spinal fever he was placed in the isolation hospital. His temperature was 102° F., and just before removal blood films were taken, which on examination showed a fair number of spirochætes.

On the third day after admission his temperature rose to 104° F. and then fell by crisis, accompanied by profuse sweating. His power of speech and reflexes were completely restored within three days of the fall of temperature and he had no further relapse.

CASE 8.—A Nafar from the Bulakatomina School was admitted on March 28th with a temperature of 102° F. His tongue was furred and white, pulse 90, respirations 18. His spleen was just palpable and tender, otherwise he presented no physical signs. He stated that he had been ill with fever four days before admission and had had considerable pains in his knee-joints. He had been on leave in Cairo, and was taken ill two days after his return.

He stated that all his family were well, and that he had enjoyed excellent health except for a bout of fever lasting seven days some two months ago.

He was taken ill in camp. Blood examination showed nothing abnormal.

Two days later his temperature was normal and remained so for eight days. The disease was considered to be some form of simple fever. However, on the tenth day after admission his temperature rose to 101° F., and next day a few spirochætes were found. Two days later many spirochætes were found; on the fifth day of the fever the temperature fell by crisis from 103° F. to normal, accompanied by profuse sweating. This attack was only accompanied by the ordinary signs and symptoms of fever.

Three days later his left knee joint became hot, very tender, and distended with fluid. There was no accompanying rise of temperature and pulse-rate; the condition cleared up rapidly and had completely disappeared in four days; he had no further relapse. This condition, I think, was due to spirochætal fever, and was not rheumatic.

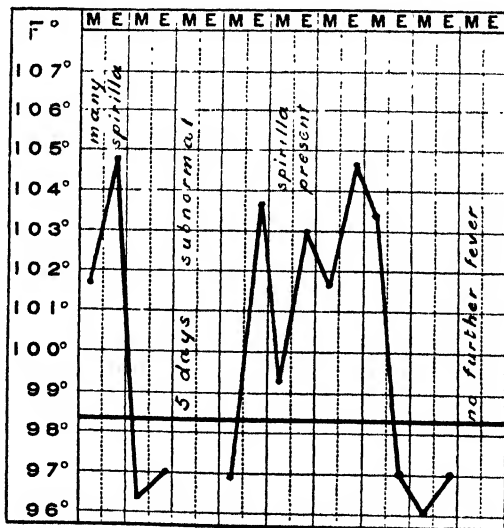
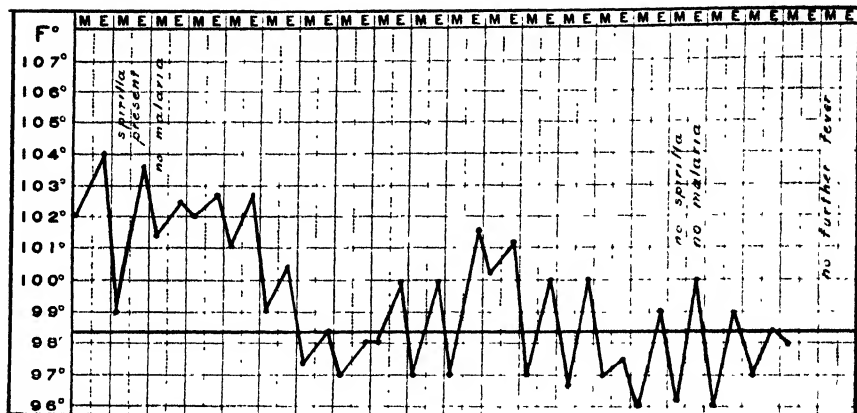
These two men came from different units, and had been on leave shortly before the onset of their illness, so that the origin could not be traced, and their clothes had been sterilised and washed on admission.

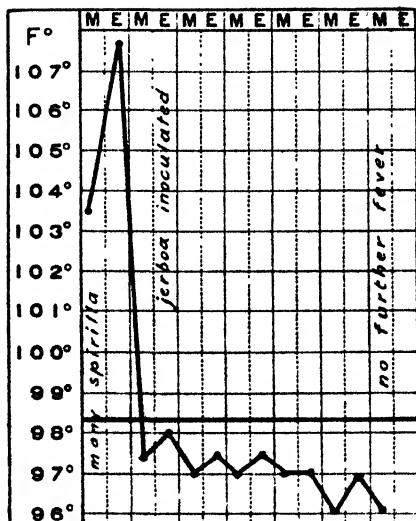
Microscopically, the spirochætes appeared identical with those seen in the Khartoum cases.

## 450 *Observations on Human Spirochætosis in the Sudan*

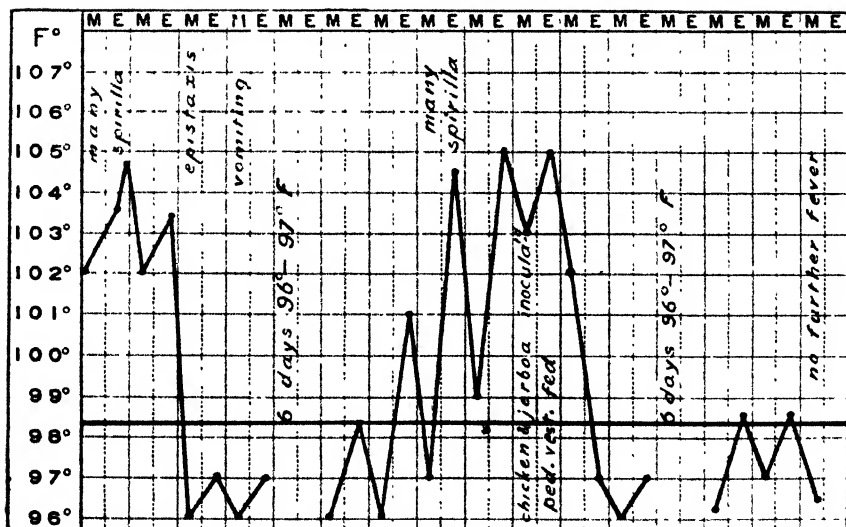
Burri's method with Chinese ink was found to show up the spirochætes wonderfully, and is a very rapid and simple process.

I have but recently used this method for diagnosis in early syphilis, and certainly the results are as wonderful as the process is simple, requiring no expert knowledge and skill.

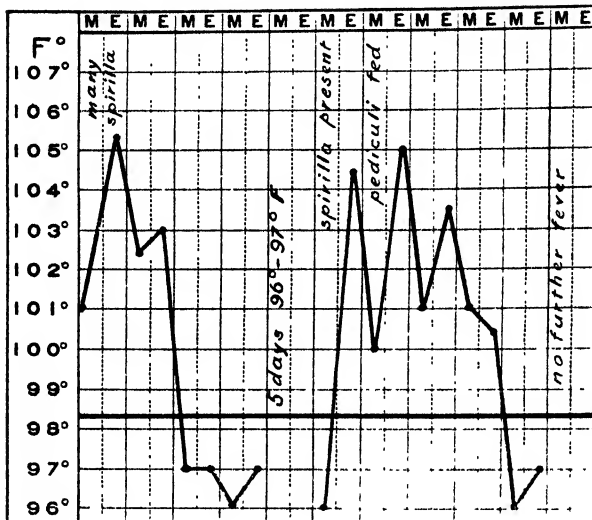




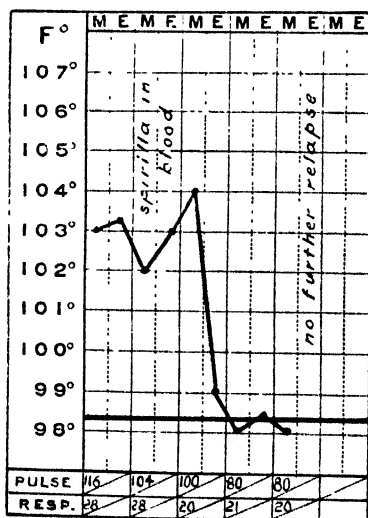
CASE 4.



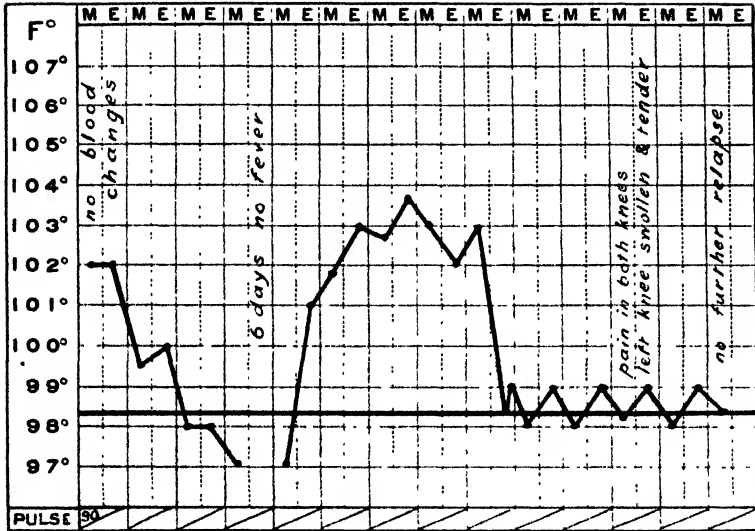
CASE 5.



CASE 6.



CASE 7.



### CASE 8.

## THE SPIROCHÆTE OF EGYPTIAN RELAPSING FEVER. IS IT A SPECIFIC ENTITY?

By ANDREW BALFOUR, M.D., B.Sc., F.R.C.P. EDIN., D.P.H. CAMB.  
*Director, Wellcome Tropical Research Laboratories, Khartoum.*

CAPTAIN BOUSFIELD has asked me to add some notes on the experimental work carried out in connection with the cases of Egyptian spirochætosis he has recorded. I do so with pleasure, but fear they are far from complete. At the time, I was working practically single-handed in the laboratory, being busy with administrative, routine and research work, and in addition had my usual duties as Medical Officer of Health for Khartoum to perform. Hence it was impossible to carry out research work on this spirochætal fever in any great detail. The unfortunate loss of the strain, combined with the recovery of all the patients, brought the work to an untimely end, but it has been possible to come to certain fairly definite conclusions which are here stated.

In the first place a word as to the morphology of the spirochætes concerned. One would like to have studied these by the dark ground illumination method, but at that time I did not possess the necessary apparatus. I only examined stained preparations of human blood, though I observed the parasites in fresh films from the blood of successfully inoculated animals, monkeys and gerbils.

In films stained by Leishman's method the spirochætes are found to vary in length from  $13.5\ \mu$  to  $22.5\ \mu$ , while their breadth was about  $0.25\ \mu$ . The number of spirals varies from two to six, and the most characteristic feature of the parasites is the great irregularity of these spirals and the marked tendency to the formation of loops, circles and figure-of-8 forms. Fig. 1, a, b, c. A small and narrow spiral is frequently succeeded by a large and wide one, so that there is nothing to be gained by measuring the individual spirals. So far as this feature went there is a distinct resemblance to *Spirochæta duttoni*, and it is noticeable in human, monkey and gerbil blood. For the most part the spirochætes stained uniformly. Where breaks appeared in the ribbon they could usually be explained as divisions between dividing forms. Parasites in gerbil's blood, however, tended to show unstained points in the chromatin core (fig. 1, c.) This is also true to a lesser extent of those in monkeys' blood (fig. 1, b.) In the light of the animal inoculations (*vide infra*), is it to be regarded as an expression of the unsuitability of the

medium to the spirochæte? No evidence of longitudinal division has been seen, and never more than two spirochætes have been found united end to end. Their ends are as a rule finely pointed.

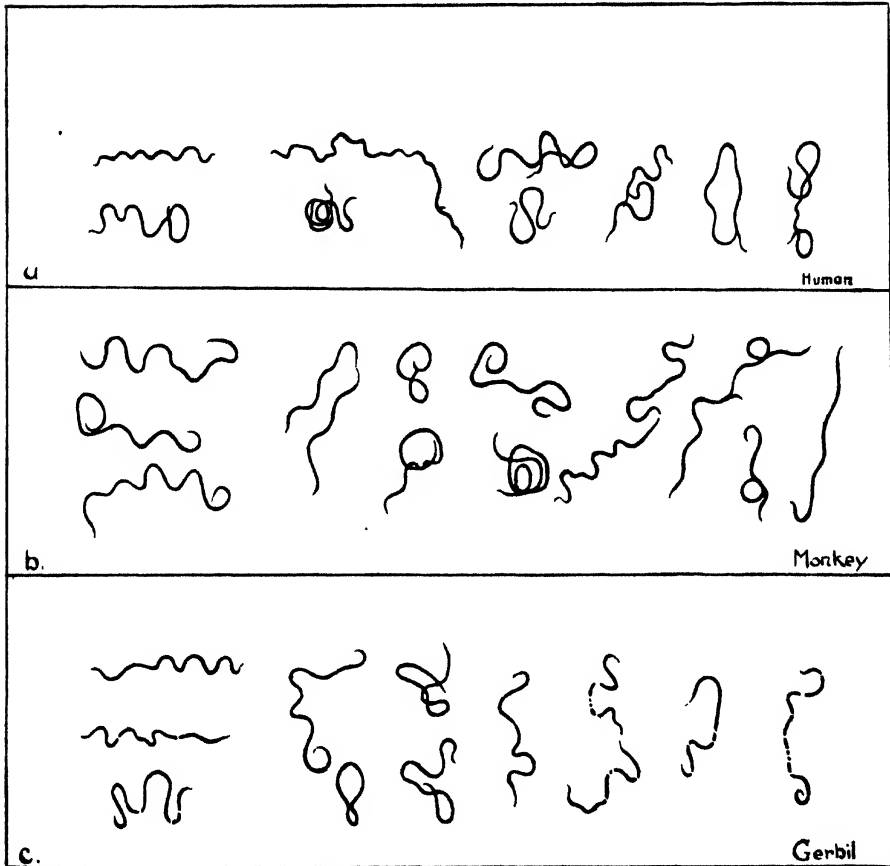


FIG. 1.—To show morphological features. Not drawn to scale.

#### ANIMAL INOCULATIONS.

##### I.—GERBILS.

On January 12th, 1910, a gerbil or desert mouse (*Gerbillus pygargus*), No. 1, was inoculated subcutaneously with the blood of a patient which showed spirochætes. On January 14th, this animal for the first time exhibited parasites in its peripheral blood, an incubation period of two days. The spirochætes were fairly

numerous but the animal showed no sign of illness. A few drops of its blood were taken, citrated and inoculated into gerbil 2.

On January 15th spirochætes were still present in the blood of gerbil 1, but they were absent on the 16th, and, despite daily examinations up to the 24th, and occasional observations thereafter, they were never again found. The gerbil at no time appeared ill.

*Gerbil 2.*—Inoculated from gerbil 1, as stated on January 14th. Showed spirochætes for the first and only time on January 18th. Never ill.

*Gerbil 3.*—Inoculated from gerbil 2 on January 18th. Showed spirochætes on January 20th, for the first and last time, but it was chloroformed on January 22nd, as it was looking ill and its coat was rough. Some of its heart's blood was used for the inoculation of a monkey (*vide infra*).

*Gerbil 4.*—Inoculated from gerbil 3, on January 20th, in order to preserve the strain. A bacterial infection resulted from which the animal speedily recovered but, possibly as a result of this accident, it at no time exhibited spirochætes. On January 24th it was chloroformed and a few drops of its heart's blood were inoculated into gerbil 5. No spirochætes could be demonstrated in this heart's blood. Its liver and spleen examined by the Levaditi method also failed to show spirochætes.

*Gerbil 5.*—Inoculated as just stated with apparently sterile heart's blood from gerbil 4 on January 24th. It remained perfectly well and at no time exhibited a spirochætal infection.

*Gerbil 6.*—Inoculated on January 18th with a few drops of citrated finger blood from a patient in the *non-febrile stage*. It never showed spirochætes.

From the above it will be seen that the strain in gerbils was unfortunately lost.

## II. MONKEYS (*Cercopithecus sabæus*).

*Monkey 1*, as already noted, was inoculated with some of the heart's blood of gerbil 3, at a time, however, when the latter animal exhibited no spirochætes in its circulation.

This inoculation proved negative, and, as an opportunity was afforded on January 25th of inoculating this same monkey (the only one which, on that date, could be obtained) with blood from one of the cases in hospital, this was done and the monkey received subcutaneously three drops of finger blood from an Egyptian soldier who had relapsed and was showing spirochætes in his blood.

The monkey was found to be infected on January 29th, there being a good many spirochætes present in the peripheral circulation. The incubation period was, therefore, apparently five days. This infection increased, and by January 31st might be described as heavy. On this day the animal looked somewhat ill. No coryza was noticed. Its temperature was taken daily, and the

## MONKEY No. 1.

*Corcopithecus Sabaeus*, ♂.

Disease: Relapsing Fever (Egyptian).

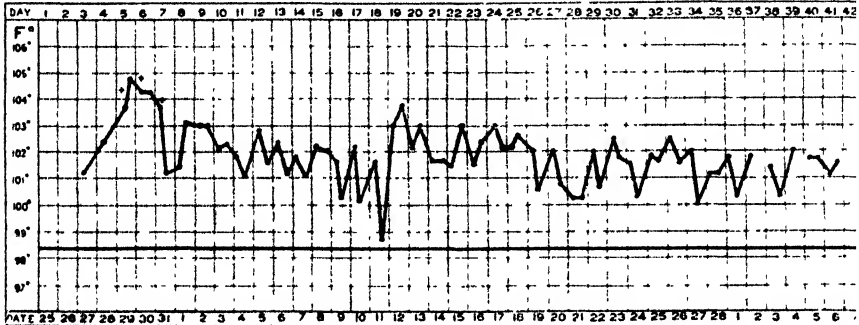


FIG. 2.— + sign - Spirochætes in peripheral circulation.

chart (fig. 2) shows the course followed. On February 1st, though the animal still appeared ill, no spirochætes could be found. On February 2nd the monkey looked better and the search was again negative.

With the fear that one had delayed over long, a small quantity of finger blood was taken, citrated and inoculated into monkey 2.

Monkey 1 remained well and did not relapse. Although on February 13th its temperature rose suddenly, no spirochætes were found in its blood.

At the time they were present lice and ticks were fed on the monkey in connection with experimental work on the possible carrier of the virus (*vide infra*).

*Monkey 2 (Cercopithecus sabaeus).*—Inoculated subcutaneously on February 2nd, from monkey 1, at a time when the latter's temperature was still elevated, although spirochætes had apparently disappeared from its peripheral blood. It is unfortunate that a monkey was not obtainable at an earlier period for inoculation with blood rich in spirochætes, as no infection occurred, but, as will be considered later, this negative result is of some interest and importance. One cannot but regret that great press of work prevented these inoculation experiments being carried out in a more extensive and thorough manner, although it is true that the peculiar

behaviour of the strain was one cause of the limiting of the observations. It was only the importance of trying to come to a conclusion regarding the precise nature of this spirochætosis which induced one to undertake the investigation at a time when one was overburdened with other work which had to be completed. Human spirochætosis being practically unknown in the Sudan, so far as one can tell, it was felt that the opportunity should not be missed.

### III. JERBOA.

On January 26th, a jerboa (*Jaculus gordonii*) was inoculated with finger blood from a relapse case. No infection or illness resulted. This jerboa had a heavy hæmogregarine infection.

### IV. CHICKEN.

On January 26th, a young chick was inoculated with finger blood from the same relapse case. No infection or illness resulted.

### V. FEEDING AND INSECT TRANSMISSION EXPERIMENTS.

(1) *Bed Bugs*.—As stated by Captain Bousfield, a certain number of bed bugs was secured from crevices in the barrack walls close to where the infected men slept. These were gorged with blood, but dissection of some of them failed to reveal any spirochætæ either in their stomach contents or in their tissues. A few were fed on a gerbil and the tissues of several were made into an emulsion and inoculated into another gerbil, but in both instances the result was entirely negative.

(2) *Lice* (a).—On January 17th, five lice (*Pediculus vestimenti*) were obtained from the clothes of a recruit who had been in contact with the patients. One of these lice was immediately dissected, but no spirochætæ were found. The remaining four were placed on a gerbil which was kept in a jar, the base of which stood in a vessel containing water. On January 18th, another batch of five lice was secured, on this occasion from the clothes of a patient admitted to hospital three days previously. Two of these lice were dissected and examined, one on January 18th, the other on the 19th. In neither case were spirochætæ found. The remaining three were placed on the gerbil. The latter, though frequently examined, never showed spirochætæ and never appeared ill.

(b) An attempt was made to infect lice obtained from the clothes of men at the sewage farm by feeding them on gerbil 2, at the time when its blood contained spirochætæ. The experiment failed, all the lice being devoured by the mouse, which was exceedingly active.

(c) On January 25th, three lice were fed on one of the patients

during a relapse and at a time when spirochætes were present in his blood. All three became well gorged. On January 26th, two were dissected, one twenty-four hours after feeding, the other thirty hours after feeding. In the first case the whole louse was crushed and examined in the fresh state, then smeared into a film which was stained. In the second case the louse was carefully dissected and the tissues examined in the fresh state only. By an oversight the stained films of the tissues were not investigated.

On January 27th, the third louse was dissected and examined piecemeal, both fresh and stained preparations being made.

In none of these lice were any spirochætes observed, despite very prolonged and careful search, nor were any granules observed like those found by Leishman [1] in *Ornithodoros moubata* fed on blood containing *Spirochæta duttoni*, or by myself [2] in *Argas persicus* fed on the spirochætal blood of fowls in the Sudan.

(d) On January 27th, another batch of nine lice was fed in the morning on a patient showing a fair number of spirochætes in his blood. One of these, a well-gorged insect, was dissected and examined piecemeal with negative results. The remaining eight were fed on monkey 3 (*vide infra*). They were removed from the animal after feeding and next morning were all found dead, probably owing to the coldness of the night.

(e) On January 30th another batch of lice was fed on monkey 1 in the morning when the animal's temperature was 104.4° F., and spirochætes were present in its blood. Several fed well. A solitary louse was fed in the evening and kept separate from the others, all, however, being maintained at a moist temperature of 37° C. Unfortunately on January 31st all were found dead.

Indeed the great difficulty was to keep the lice alive. Three days was the longest period they ever survived, and then only when kept at 37° C. in glass jars containing pieces of paper which had been soaked in human blood. If they died during the night they were usually too dried up in the morning to be of any use for dissection.

(f) *Monkey 3 (Cercopithecus ruber)*.—As already noted under d, eight lice which had feasted on a patient were fed on this monkey on January 29th. No infection resulted.

Uniform failure then marked these lice experiments, and in part this may be due to the small number of insects employed at any one time. They were only intended as preliminary investigations, but, owing to the loss of the strain and the difficulty experienced in keeping the lice alive, are all that one has to present.

(3) *Ticks*.—A few feeding experiments with subsequent dissection and, in one instance, the inoculation of emulsified tissues into a monkey were conducted with *Ornithodoros savignyi*, both nymphs and adults, obtained from Kordofan through the kindness of Captain Cummins.

As the results were entirely negative, they need scarcely be described in detail.

These, then, are the experimental data accumulated, and it will be seen that there is little enough to go on in coming to any conclusion. For all that there are certain significant findings which may be considered.

One may say at once that, as a result of observing the disease in gerbils and a monkey, and noting the effects of sub-inoculations, one was inclined to regard this fever as possibly due to a specific and hitherto undescribed spirochæte. Captain Bousfield, from his clinical studies, wrote as though it was due to *Spirochæta recurrentis*, but I informed him that I was unable to agree with this view of the case. Shortly afterwards I had an opportunity of showing specimens of spirochætes and giving details of the work to Captain Mackie, I.M.S., who happened to be passing through Khartoum on his way from Uganda. He was inclined to agree with me, but, of course, it was difficult to say anything definite as a result of such meagre and incomplete observations.

It is worthy of note that Dreyer of Cairo [3], about the time this work was proceeding, published a paper in which he suggested that the spirochæte of Egyptian relapsing fever might be a distinct entity. He was unable, however, to advance any proof in favour of this hypothesis.

While I was writing this paper a most interesting account of a form of relapsing fever in South Oran appeared under the joint authorship of Sergeant and Foley [4]. They give an excellent account of the symptomatology, etiology and epidemiology of this human spirochætosis, and conclude, on what seem to be good grounds, that this Algerian spirochætal fever is distinct from any form hitherto described, and is caused by a special spirochæte which they propose to name *Spirochæta berbera*, nov. sp.

One would refer the reader to their paper for full details, but it is worthy of note that while the spirochæte was inoculable from man to the monkey (*Macacus sinensi*, *M. cynomologus*, *M. inuus*, *Cynocephalus sphinx*), it could not be transferred from monkey to monkey.

Now this appears also to be true of the Egyptian spirochæte,

	Egyptian <i>Sp. i</i>	Algerian <i>Sp. berbera</i>	European <i>Sp. dermatitidis</i> ( <i>trichitidis</i> )	African <i>Sp. duttoni</i>	American <i>Sp. noryi</i>	Asiatic <i>Sp. carteri</i>
Minimal length ..	13.5 $\mu$ , but possibly some coiled forms only 12 $\mu$ .	12 $\mu$ .. ..	12 $\mu$ .. ..	13 $\mu$ .. ..	7-9 $\mu$ .. ..	12 $\mu$ .
Shape ..	Irregular open flexures	Irregular open flexures	Spiral .. ..	Open flexures ..	Regularly spiral	Open flexures.
Flagella ..	?	?	Peritrichous ..	Peritrichous ?	Terminal (Novy); Peritrichous (Fränkel)	?
Animals susceptible	Gerbils, but only slightly; non-keys ( <i>Cercopithecus</i> )	Rats and mice with difficulty; non-keys ( <i>Macacus cynocephalus</i> )	Small rodents only after passage through monkeys	Small rodents and many animals very susceptible	Small rodents very susceptible	Small rodents infected with difficulty.
Course in animals	Very mild ..	As a rule, mild ..	Mild .. ..	Very severe ..	Severe .. ..	Very mild.
Sub-inoculations in animals	Gerbil to gerbil positive; monkey to monkey probably negative	Rat to rat or mouse to mouse with difficulty; monkey to monkey negative	Monkey to monkey and mouse to mouse positive (Fülleborn and Meyer)	Monkey to monkey positive; same for most animals (Breinl, Kinghorn and Garrett)	Monkey to monkey and mouse to mouse positive	Monkey to monkey and mouse to mouse positive (Mackie).
Course in man ..	Fairly severe ..	Fairly severe ..	One, sometimes two, relapses	Severe, four or five relapses	?	Severe, one or two relapses.
Parasites in human blood	Variable ..	Variable ..	Heavy infection	Very sparse ..	?	Variable.
Natural transmission	By lice ?	By lice ?	?	By ticks .. ..	?	By lice (?).
Serum-reaction ..	?	Immune serum possibly without effect on <i>Sp. recurrentis</i> (Russian strain)	Immune serum without any effect on <i>noryi</i> and <i>duttoni</i>	Immune serum without effect on <i>noryi</i> or <i>obermayeri</i>	Immune serum without effect on <i>duttoni</i> or <i>carteri</i>	Immune serum without effect on <i>noryi</i> .

	Egyptian <i>Sp. (?) possibly berbera</i>	Algerian <i>Sp. berbera</i> , nov. sp.	European <i>Sp. recurrentis</i>	Indian <i>Sp. carteri</i>	American <i>Sp. novyi</i>	African <i>Sp. duttoni</i>
Incubation period in man	Doubtful; possibly more than 12 days	Not stated ..	5-7 days..	7 days ..	5-7 days ..	7-10 days.
Duration of first attack	2-8 days ..	5-7 days ..	5-6 ..	5-7 days ..	5-6 ..	Average 3 days (rarely 4-5).
Duration of apyrexia	2-9 days; 6 apparently the most common	6-16 days: usually 7-8 days	7-10 ..	5-13 days: occasionally up to 19 days	7-10 ..	1-8 days (occasionally 10-18).
Number of relapses	One or two, possibly three	One or two certainly, possibly others, but very slight ?	1-2 ..	1 relapse in 40 per cent., 2 in 7 per cent. and 3 more in 3 per cent.	One (rarely 2-5) ..	3-5 (sometimes up to 11).
Relapses absent ..	In one case ..		?	In 50 per cent ..	Not uncommon ..	
Rigors and sweating	Present; rigors only in one case	Rigors not mentioned; sweating marked	Present ..	Very frequent..	Present ..	Rigors in 50 per cent. only, sweating present.
Pains in limbs, muscles, &c.	Present ..	Frequent ..	" ..	" ..	" ..	Frequent.
Toxæmia (bilious-typus type)	Possibly in one case	Absent ..	Mentioned ..	Present in 10-20 per cent.	Mentioned ..	?
Low pulse rate after crisis	Apparently not noted	No mention ..	Present ..	Almost invariably present	Present ..	?
The tongue	White and furred ..	Moist, white and furred in centre	Large and moist, except in grave infection	Large, flabby and moist except in grave infection	Large and moist except in grave infection	?
Appetite ..	Not mentioned: probably therefore never voracious	Not mentioned: probably therefore never voracious	Poor, sometimes voracious	Poor, rarely voracious	Poor ..	?
Jaundice ..	Absent ..	Exceptional and slight	Mild except in grave infection	Present in 70-80 per cent.; grave in toxæmia	Mild, except in grave infection	Infrequent in Uganda.
Vomiting of bile..	Not mentioned: vomiting present	Not mentioned; vomiting present	Not uncommon ..	Present in 70-80 per cent.	Not uncommon ..	Not usual.
Diarrhœa ..	Absent ..	Rare ..	Of brief duration	Present in 12 per cent.	Moderate ..	Always in the Congo; infrequent elsewhere.

Tympanites	Not mentioned	Common	Grave in toxæmia	Invariably associated with toxæmia	Grave in toxæmia	?
ce Hiccough	..	Not mentioned	Present ..	Often present ..	Present ..	Mentioned.
Hæmorrhage from stomach and intestines	..	..	Not frequent	More frequent than in the other varieties	Not frequent	?
The liver	Tender, but not markedly enlarged	Enlarged and tender	Enlarged ..	Enlarged and tender ..	Enlarged ..	Enlarged.
The spleen	Enlarged and tender	..	..	..	..	..
Parotitis	?	?	Mentioned	Present in about 10 per cent.	?	?
The urine	No albuminuria	Dark; excess of urobilin; slight albuminuria	High-coloured, scanty	High, bilious, scanty ..	High coloured	?
Hæmaturia	Absent	Absent	?	? more frequent than other hemorrhages	Present	?
Epistaxis	Mentioned	Mentioned	Mentioned	Present in 10 to 15 per cent.	More frequent than other hemorrhages	Mentioned.
Pulmonary symptoms	..	..	..	Present; more so in toxæmia	Present ..	..
Delirium (violent)	Absent	Absent	..	Not uncommon; also maniacal	..	Infrequent.
Facial paralysis	..	..	?	Not observed ..	?	Mentioned.
Eye affections	..	Slight conjunctival injection	Mentioned	Present in about 1 per cent.	Mentioned ..	Frequent (Moffat, Harrold, and Cook). ?
Herpes labialis	May occur	May occur	Not uncommon ..	Not uncommon	?	13-6 per cent. (?) ; about 50 per cent. on the Zambesi (?), probably lower.
Mortality rate	Nil (8 cases)	Nil (42 cases)	Very low, under 5 per cent.. except in grave infection	30 to 40 per cent. in all cases; if toxicemic cases are excluded 15 to 20 per cent. ..	2 to 4 per cent., rarely 10 per cent. higher in toxæmia	

although my single inoculation from monkey to monkey (*Cercopithecus sabaeus*), was, most unfortunately, not made at the time most favourable to ensure success.

Sergent and Foley found that rats and mice could be inoculated, but ran a very mild course and recovered. This I found true of gerbils. They also observed that it was well-nigh impossible to obtain successive passages in rats and mice. These sub-inoculations only succeeded in the case of some newly born mice. I have no parallel observation to record, and had no ordinary laboratory white rats or mice available. I obtained some white rats with all speed from Cairo, but they arrived too late.

Considering the paucity of my experiments and observations, it is perhaps scarcely worth while to enter at great length into a full comparison between this Egyptian spirochaetosis, the well-known American, European, African and Indian varieties, and the new Algerian type, but taking a leaf out of Mackie's and Choksy's books, I have followed the excellent plan of comparative tables adopted by them, and, so far as is possible, have compared all the different species of spirochætes and the fevers they cause. I have added somewhat to Choksy's lists and altered them as seemed desirable with the results shown in the tables. The entries regarding the symptomatology of the Egyptian fever are of course derived from Captain Bousfield's paper, and from such recollection of the cases as I possess.

It is scarcely necessary to point out that such tables as those given must be accepted with some reservation. A great deal, naturally, depends on the personal equation, both as regards the observer and the patient, while environment may play a part. Again, it is scarcely scientific or correct to compare an epidemic of eight cases with one of forty-two, or to compare the symptoms seen in both with those observed in a very large number of cases of the other form of spirochaetosis. Still, bearing these sources of fallacy in mind, the comparisons may be of some service.

This Egyptian spirochaetosis is certainly not the true African form due to *Sp. duttoni*; the American variety, for several reasons, can be excluded and the animal reactions would appear to put the European form out of court. Of the well-known varieties there remains the Indian type, due to *Sp. carteri*. It is strange that Sergent and Foley do not compare their spirochæte with the Indian species, or the Algerian illness with that prevalent in India. This is the more remarkable as there is evidence in both diseases to show that lice act as carriers of the virus, a fact mentioned by the

French observers. Perhaps, however, they did not trouble to do so owing to the fact that the results of animal inoculations differ in the two cases. *Sp. carteri* can be transmitted from monkey to monkey and from mouse to mouse. Moreover, the blood of a monkey in the apyrexial stage remains infective, so that Mackie [7] concludes that the spirillum remains in the circulating blood in an unrecognised and ultra-microscopic form.

Taking everything into consideration, I believe that Sergeant and Foley are justified in regarding the fever in South Oran as a special form due to a specific spirochæte, and, from such facts as one has been able to gather or establish regarding the Egyptian illness, I am inclined to think it is the same disease, due therefore to *Sp. berbera*, and conveyed by lice. This also despite Strong's [8] note to the effect that he has seen in Egypt infections due both to *Sp. recurrentis* and *Sp. duttoni*.<sup>1</sup> The view advanced is in favour of Dreyer's supposition, but it is evident that much more work will have to be accomplished before we can be absolutely certain that there is a distinct North African spirochætosis of man. It is, perhaps, a little surprising that more has not been done in Egypt to clear up this important question. For those desirous of entering more fully into the matter, I append to the attached references a list of recent papers likely to be of use. Some of these are mentioned by Captain Bousfield. Mr. George Buchanan has executed the drawings and prepared the chart with his usual care and skill.

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<sup>1</sup> I wrote Dr. Strong about his cases and he has very kindly replied to the effect that "the case infected apparently by *Sp. duttoni* was observed in a man who I believe had previously been a sailor on one of the steamers which landed at Port Said. I inoculated white mice with his blood which later showed the parasites. *It seems quite possible that the case might have been an imported one.*" The italics are mine. Dr. Strong does not furnish information regarding the *Sp. recurrentis* cases.—A. B.

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TACTICS OF MEDICAL UNITS.<sup>1</sup>

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I DO not propose to go into the elements of map-reading, as I shall take it for granted that you all know the ordinary conventional signs used in map-making. Maps are used on Field Service for two main purposes:—

(1) To find one's way about.

(2) To gain such a knowledge of the geography and configuration of the country over which one has to work, as will enable one to form one's tactical plans without being obliged to visit and reconnoitre every point of it.

The official map of the British Army for manœuvre purposes is the Ordnance Survey,  $\frac{1}{2}$  inch to the mile.

To find one's way about with a good map is not a difficult problem, and I suppose that in the present day of bicycles and motor-cars, every one of us has practised the use of maps, and could be reckoned on to make an intelligent and accurate use of them. The first thing to do is to "orient" one's self—that is, to recognise the north, south, east, and west of one's position.

I think I need hardly remind you of the methods of doing this. Every officer should carry a compass in the field, and must remember that in England the deviation of the magnetic needle from the true north is about  $15^{\circ}$ , the needle pointing to the west of the true north.

The sun and a watch give a sufficiently accurate method in this latitude. If the hour hand of the watch is pointed to the sun holding the watch horizontal, then a line bisecting the angle between the hour hand and 12 o'clock points to the south. At night we have the Pole star as a guide, found by means of the two pointers of the Great Bear, always visible at this latitude. Having fixed these points, one proceeds to fix one's own position on the map. This is done by estimation of its distance and direction from some known place or object which can be recognised on the map. Thus let us suppose that one has passed a village named X. by, let us say, two miles, having come south-east along a high road and that half a mile back one passed a turning on the right with a sign post directing to Y.—i.e.,  $1\frac{1}{2}$  miles from X. The scale of the map is

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<sup>1</sup> A Lecture given to the Medical Officers of the North Midland Division.

$\frac{1}{2}$  inch to the mile. One finds X., looks for a main road leaving it in a south-east direction, follows it down for  $\frac{3}{4}$  inch until one comes to a turning to the right, which one recognises as leading to Y. Then by measuring  $\frac{1}{4}$  inch further along the road, one locates one's position.

After having found this, to find one's way to any required spot, marked or described on the map, all that is required is to proceed the required distance, as shown by measuring on the map, in the required direction; of course checking one's position as one goes along by reference to objects passed, and their position on the map.

The use of the map is not difficult and only requires a good map and a little practice, but the second use, that of studying the ground with a view to the preparation of tactical schemes, is much more difficult and involves much practice and considerable knowledge of the application of configuration to tactics. The subject of medical tactics is an exceedingly interesting one, and one about which there is little to be found in books. Our present field medical unit, the Field Ambulance, is a new creation and has never been tried in war, and therefore anything one says about it is more or less theoretical or the result of experience gained in peace manœuvres.

The unit of the British Army is the Division, and it is with the work of the medical units of a Division that we are now dealing. The Administrative Medical Officer of the Division has as large an area of country to deal with as the General Officer in Command of the Division himself, and has to know almost as much about it if he wants to be able to render effective medical service. Officers commanding Field Ambulances have to deal with areas occupied by brigades and section commanders with areas correspondingly decreased to that occupied by the troops they serve. Perhaps the best way of considering the subject is to consider how one would deal practically with the medical aspects of a tactical scheme in which a division is engaged.

We will suppose that the whole division is working together, either as an independent unit or as part of a larger army. The tactical scheme will be issued in a complete form in Divisional Operation Orders. These orders will be drawn up and issued by the Divisional Staff to all units of the division. The Administrative Medical Officer will be responsible for the medical details of these orders, as the Staff Officer will consult with him before compiling them. The Administrative Medical Officer before he

makes his dispositions will be given full information as to what the division is to attempt, what is its point of attack, what its front, how its units are distributed, along what roads the units will proceed, where any special attack is to be driven home, and where they will fall back to in case of failure.

The orders will always be made with reference to some particular map, which will be quoted in the orders, and the places referred to will be described so as to be easily recognised on the map. At this point it will perhaps be well to consider for a few minutes what sort of area is likely to be covered by a division in action.

This will depend, to a great extent, on the nature of the action to be fought.

Engagements are roughly classified as attacks, defences, and encounters. Most engagements will probably be a combination of these, for the defenders should always be prepared to deliver a counter attack, and both sides may decide to attack at the same time, producing an encounter. In defence the medical arrangements are much easier to make than in the other two. The ground to be defended is definitely known beforehand, the sites of dressing stations and field hospitals will be under cover of the position, and can be brought up close to the firing line. All casualties will occur within a definite and circumscribed area, and the whole ground can be thoroughly inspected before making dispositions. In attack and encounter it is otherwise. It is impossible to visit closely the ground over which one will have to work, so that one has to rely on reconnaissance, reports, and maps. Moreover, the areas occupied by the attackers must always be larger than that of the defenders, as the attack will always involve an attempt to turn a flank if possible.

As to the actual frontage likely to be occupied by a Division in attack, the following gives one some sort of an idea :—

It will be remembered that a division consists of three Brigades of Infantry and contains three Field Ambulances.

From a tactical point of view one can neglect the other arms, *i.e.*, the Artillery and Engineers, as they will always be covered by, and included in, the line of the Infantry, and their casualties can be dealt with by the bearers as the casualties from the firing line to the dressing station. In the attack the density of the firing line will depend on whether the attack is intended to be pressed home or is only a holding attack. No absolute rules can be laid down in matters of this kind, but the books lay down *for guidance* that in a serious attack a battalion finding its own supports and local

reserves (the method usually adopted) can cover a frontage of 600 yards.

In addition to this the general reserve (generally made up of other complete units) should be at least half the whole force. Suppose, therefore, a Division of three Brigades, each of four battalions, attacking, six battalions would be in the firing line, forming their own supports and local reserves, and six would be in general reserve. This would give a frontage of 3,600 yards, or a little over two miles.

Now, of the three Field Ambulances, at least one would have to be kept in reserve, so that the two Field Ambulances first employed would have to deal with a frontage of two miles, or one mile each. If, on the other hand, the whole division were engaged in a holding attack, while the main attack was being delivered in another part of the field by other troops, then the general reserve might be reduced to one-fourth of the whole force. This would allow nine battalions in the firing line instead of six. In this case the front would be at least 5,400 yards, or three miles. But, in holding attacks it is allowable to extend troops much more widely, so that a battalion can cover much more than 600 yards, and the total frontage might be four or five miles.

In such a case, however, it may not be necessary to keep a whole Field Ambulance in reserve. One section might suffice, which would give two extra sections to deal with the increased front.

As to the number of wounded that may have to be dealt with: in a battle the losses may be anything between 5 per cent. and 20 per cent. of the number of troops engaged.

In a Division of, say, 15,000, probably about 12,000 would be actually engaged in a serious battle, and their losses would, on the above estimate, be between 600 and 2,400. Of these about one-fifth would be killed, leaving between 480 and 1,920 wounded to be dealt with by the Field Ambulances. The Field Ambulance stretcher squads can deal with only a very small proportion of these casualties. The large majority must receive their first aid from the regimental stretcher bearers and must find their own way to the dressing station. A Field Ambulance is only equipped for 150 patients, but it may have to deal with anything between 160 and 640 patients. It will be seen that the Regulation allowance of medical *personnel* is none too generous, and the work of the medical units is not likely to be light. This gives one some sort of idea of the amount of ground likely to be covered by the medical units of a division and the amount of work that may be expected of them.

We will now proceed to consider how one would make dispositions for the employment of the medical units in an engagement. As I said before, an Administrative Medical Officer, before making his dispositions, will be informed as to *the point of attack, the length of frontage* as shown on the map, *how the fighting units are to be distributed*, and *along what roads they will advance, where any special attack is to be driven home* (for there the casualties are likely to be heaviest, and *where the division will fall back in case of reverse*. Having received this information, he will examine his map and identify all the places mentioned, and then endeavour to get as thorough a knowledge of the geography and configuration of the ground as possible. He will consider the length of front with which he will have to deal, the number of separate columns for which he will have to provide units, the character of the roads or tracks by which they will approach the position and whether these are likely to be suitable for ambulance wagons or not. The undulations of the ground over which the troops will pass will be identified with a view to the cover likely to be afforded to the troops as they approach the position, and the possibility of getting wagons safely close to the places where the final assault will take place with its necessary heavy casualties.

He will look out for suitable spots for dressing stations, bearing in mind that these should be on *main roads, out of the line of fire, with good water supply* and *suitable for the encampment of the Field Ambulance and the establishment of a Field Hospital, if necessary*, after the engagement. He will look out, if possible, for places where there are houses or buildings likely to be suitable for use as a dressing station. It is an axiom to use these instead of pitching tents wherever possible, because it involves less unpacking and leaves the unit more ready to advance immediately with the troops. Any patients not yet sent back can be left in them to be taken over by the *personnel* of a Clearing Hospital following the army. The course of streams will give him some idea of water supply. Then he will consider the question of the evacuation of the wounded from the Field Ambulances. He will study the railway system and look out for the nearest railway stations, notice their size, single or double line, suitability for entrainment of patients, their distance from the probable dressing stations, and routes by which they would be connected with the nearest stationary or general hospitals. He may also consider the use of rivers and canals as possible means of evacuating the Field Ambulances. He will naturally select for entrainment the station in most direct railway connection with the

general hospitals and a route which will not be exposed to the enemy's rifle or artillery fire.

As regards cover from fire, the contour lines on the map will give some help by showing the various levels of the ground in front of a position: but there are many fallacies in this method of estimation, and unless a very large scale map, say 6 inches to the mile, is available, it can often only be decided whether one point is visible from another by actually visiting it. Woods, it must be remembered, hide from view but not from fire. Having considered all these points, an Administrative Medical Officer will make his recommendations for the distribution of the medical units and for the orders to be issued to them.

In the distribution of units he will first decide how many of them he will keep in reserve. With a whole Division this should be, as a rule, at least one Field Ambulance, though under certain circumstances, mentioned above, as when the attack is only a holding one, it might be less.

Then he must decide whether the Field Ambulances to be used for the firing line shall be told off to work with specific units of the Division, or whether they shall be allotted independently to deal with certain fixed areas of frontage, to be mentioned specially in orders.

In deciding this he will take various points into consideration: (1) The number of units, *e.g.*, Brigades in the firing line and the number of Field Ambulances at his disposal. If these correspond it will perhaps be better to make them correspond also in distribution, but if not, rather than divide up the Field Ambulances at this stage, it will be better to give each Field Ambulance a certain frontage to serve.

(2) The time at his disposal. He may have had great difficulty in clearing his Field Hospitals of those wounded in a previous engagement, and it may save time for the Field Ambulances to go direct to their sphere of action after and independently of the combatant units.

(3) At night, each Column or Brigade should be always accompanied by the medical units which are to serve it, even if this involves splitting the Field Ambulances into sections; otherwise there is grave risk of their losing their way and not being at hand when wanted.

Having decided this point, the next to settle is how much shall be put in orders, and how much be left to the Field Ambulance Commanders. The rule in the framing of orders as laid down in

"Field Service Regulations," Part 1., p. 23, is as follows: *An operation order should contain just what the recipient requires to know and nothing more.* "It should tell him nothing which he can and should arrange for himself. The general principle is, that the object to be attained, with such information as effects its attainment, should be briefly but clearly stated; while the method of attaining the object should be left to the utmost extent possible to the recipient, with due regard to his personal characteristics. It is usually dangerous to prescribe to a subordinate at a distance anything that he should be better able to decide on the spot, with a fuller knowledge of local conditions."

"Field Service Regulations," Part 2, Para. II., s. 77, Chapter X., says: "The work of removing the sick and wounded during actual fighting must be left in all circumstances to the initiative of Commanders of the Field Ambulances and to the Medical Services with regimental units. The Administrative Medical Officer will only be concerned in issuing orders relative to the opening or closing of the Ambulances and to the maintaining of the link between them and the Clearing Hospitals; for this purpose he will indicate to all concerned the place to which dressing stations and tent divisions should send back the sick and wounded."

As to the question of fixing the dressing stations in orders, this will depend on circumstances. If suitable places are obvious beforehand, it is best to have them inserted in orders in order that there may be no delay and no confusion, and that all the troops may know where to find them. But if the ground has not been thoroughly reconnoitred or the conditions and place of battle are uncertain, then the decision is best left to the commanding officer or given to him by special order during the engagement. Whenever a commanding officer himself makes such a decision he must at once inform the Administrative Medical Officer. In night operations the site of the dressing station as mentioned above will always be fixed beforehand and mentioned in Divisional Orders, and should generally correspond with the position of assembly or deployment of the troops. The place to which Field Ambulances will evacuate will always be given in orders, and if possible the time at which they will be ready to receive the wounded. As a rule, one Section of the Tent Division is ordered to the place to superintend the embarkation of wounded into the trains, &c., and this will, if necessary, be detailed in orders.

An officer commanding a Field Ambulance will therefore know with what troops he will have to act, what is their point of attack,

and what is the frontage which he has to cover. He will be told the point of evacuation and the position and sphere of action of the neighbouring Field Ambulances. He may or may not have the site for the dressing station given or suggested to him. When he receives his Divisional Orders containing all this, using his map he will locate his position, his frontage, his line of advance, and his probable dressing station or stations, for he may find more than one necessary. He will then decide how he will evacuate to the evacuating place, how he will keep communication with his neighbours, whose positions he will also have located on his map, and how he will avoid overlapping his neighbours' work. He will then subdivide the area allotted to him among the sections of his unit, giving his orders definitely to the Section Commanders in such a way that each knows his sphere of action and so as to leave no part unprovided for and to have no overlappings, so that the whole is in direct communication with himself, as he is with the Administrative Medical Officer, at the same time giving to the Section Commanders such freedom of action as will enable them to use their men to the best advantage, and to make use of such local helps as can only be discovered by them on the spot.

You will thus see how the medical part of the scheme for a field operation is developed, and how maps may be used in forming it. It may be, of course, that the ultimate details can only be decided by a careful examination of the ground on the spot, and circumstances may make it necessary to alter the scheme when made, but in case of alteration full and immediate details of such changes must be sent to all concerned. The whole of the working depends on the close connection between the various units with one another through the Administrative Medical Officer. For this purpose Field Ambulances should endeavour to have a trained staff of signallers and also of cyclists as orderlies.

You will see that the subject of medical tactics is an interesting and often a difficult and complex one. There is often work to be done for which you will have very insufficient numbers to deal with it as you would like. You will have to do the best you can, and those that are less hardly pressed will have to help those that are more so. The connection in the field between the medical units and the Medical Service with combatant units I have not touched on, as we dealt with it on a previous occasion.

## Clinical and other Notes.

### "HATA," DIOXY-DIAMIDO-ARSENO-BENZOL.

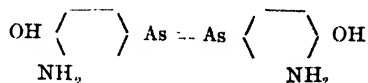
BY LIEUTENANT-COLONEL C. BIRT.

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THE German Institute of Chemotherapy, under the direction of Ehrlich [1], has been engaged for years in the study of the curative values of innumerable synthetic organic bodies. As the result of almost countless experiments on animals, a few substances only have given indications of being applicable to general therapeutic use. These are—arsenophenylglycin, trypanosan, and dioxy-diamido-arseno-benzol, known as "Hata" or "606." Ehrlich employs the terms, "organotrope" and "parasitotrope," to express the relative affinity of chemical substances for the tissues of the body and the invading parasite respectively. A preparation may exert a strongly destructive effect *in vitro*, yet may be powerless when injected into the animal body. Koch's research on the action of mercuric chloride on anthrax may be quoted as an example. If this salt be administered to an infected animal in doses larger than those which are necessary to destroy the bacillus in the test-tube, it has no influence on the infection, but the animal dies of mercurial poisoning. Here, then, the organotrope properties of the sublimate exceed the parasitotrope. Bechhold has made similar observations on the halogen derivatives of phenol, which are germicidal in high dilution, but are useless therapeutically. Hata ascertained that a one in six million solution of methylene blue destroyed *in vitro* the spirillum of relapsing fever, yet if he injected five hundred times this amount into a mouse infected with this organism the course of the disease was not delayed. On the other hand, a substance may be harmless to a parasite *in vitro*, while *in vivo* it may exhibit potent effects. Mesnil found that a  $\frac{1}{1000000}$  dilution of atoxyl injected into man causes destruction of trypanosomes, although they were unharmed by a saturated solution *in vitro*. Ehrlich has shown that this action depends on the atoxyl undergoing reduction in the tissues. The product which is formed is highly trypanocidal. Other parasitotrope bodies may act in a different manner. Some basic dyes, pyronine for example, will cure trypanosomiasis when a  $\frac{1}{100000}$  to  $\frac{1}{10000}$  solution is injected, a dilution far higher than that which will affect the trypanosomes outside the body. In this case the parasites in the animal are not killed, but their nuclei are attacked and their multiplication is arrested. Tryparot is not deadly to paramœcia, which can survive in a solution for weeks, but their power of reproduction is suppressed. By cultivating trypanosomes in media containing dyes of the orthokinone series, Werbitski bred a race which was

remarkable in its wanting blepharoblasts. This characteristic was preserved through twenty generations. If the life of the individual parasite be limited to a few hours only, then this hindrance to reproduction is equivalent to complete disinfection of the body. There is another way by which cure may be effected. Suppose that a chemical preparation be injected into an infected animal by which half the parasites are killed, their dead bodies call forth antibodies which are rapidly elaborated according to the researches of Wassermann, Schelling, Mesnil, and Ehrlich. Hence cure is brought about partly by destruction of the parasites by the chemical agent and partly by the antibodies which speedily appear. Uhlenhuth's work on fowl spirillosis shows that this is no idle fancy. If the spirilla and the arsenical preparation were injected simultaneously, the results were much less favourable than when the remedy was administered a day or two after the appearance of the parasites in the blood. Ehrlich thinks that this underlies an important principle. He would delay treatment in the earlier stages of an infection, and would wait until the invading organism was present in large numbers, for then with an "ictus immunisatorius" he would destroy them in their millions. This corresponds to Nature's method when the crisis, or curative reaction, comes on at the acme of an infection.

Paradoxical as it may appear, a "contrary effect" sometimes may be manifested. A substance highly lethal *in vitro* may *in vivo* aid and abet the infection, and may cause an increase in the number of parasites. Hata has seen this "contrary effect" produced in the spirillosis of fowls, and Marks has observed it while treating the proteosoma infection of birds. Ehrlich thus explains this anomaly. It is a not unusual phenomenon that a substance which is inimical to an organism in a large dose is favourable to its growth in a small dose, and in those instances in which a "contrary effect" is observed, the quantity of the chemical reagent which the parasite fixes is so small that it is sufficient to stimulate but not to destroy it. Ehrlich therefore inclines to his "Therapia magna sterilans." He would throw into the body one, and only one, massive dose of the parasitotrope chemical substance which would free it, once and for all, from its invading parasitic foes. His ideal has been attained by the signal success which has been achieved in the treatment of syphilis with dioxy-diamido-arsenobenzol.



This preparation has been investigated by Ehrlich's co-worker, Hata, and hence is called by his name, or by the number 606. Hata proved that its parasitotrope properties were highly marked. One fiftieth of the dose poisonous to birds is sufficient to cure fowl spirillum fever. It causes the disappearance of the *Treponema pallidum* in twenty-four hours in the primary lesion of a rabbit which has been induced by

inoculating it with syphilitic virus. Every week the German medical press publishes eloquent testimony of the marvellous action of the remedy. Wechselmann [2], the head of the Skin Department of the Virchow Hospital, Berlin, has used "606" in 503 cases of syphilis. He states that it acts on specific lesions with a rapidity which no other known substance even distantly approaches. Two severe cases of rupia recovered in a fortnight. A phagedenic chancre with roseola was treated with an injection of "Hata." The rash faded four hours afterwards. The sore was healed, and induration had gone in five days. In a case of an immense chancre on the lip with great induration, which had proved refractory to mercury, no trace of the lesion remained twenty days after a dose of "606." A patient with large ulcers on the tonsils and numerous erosions on his penis and scrotum recovered in a fortnight under the remedy.

The secondary patches in the throat and on the labia of a girl disappeared in eight days after one injection of "606." A large gyrate papular syphilide which had remained uninfluenced by five mercurial courses receded in eight days after the administration of "Hata." A rupial eruption of seventeen months' standing, rebellious to many mercury cures, recovered in a fortnight after a dose of "Hata."

A girl underwent the inunction treatment in February. Very severe rupia supervened, sloughing ulcers of her throat prevented her swallowing. Eight days after an injection of "606" her fauces were healed and the rupial sores had cicatrised. Just as incredible is another case of malignant syphilis. Infected seven months, vigorously treated with inunctions and mercurial injections—rupia, phagedenic ulceration of throat, necrosis of nasal bones, joints affected. Very emaciated, fed by oropharyngeal tube, pulse 120; prognosis very unfavourable. Yet improvement began three days after an injection of "606." Healing of the throat and rupial ulcers was completed in twelve days, and he could swallow; the *ozæna* disappeared and he gained 8 kilogrammes in a month.

In another example of malignant syphilis which resisted mercury and iodides there was general rupia, sloughing ulcers in the fauces, and extreme weakness. Nevertheless, everything had disappeared three weeks after the administration of "606."

A man developed nervous symptoms, attacks of giddiness and aphasia after infection; notwithstanding energetic mercurial treatment a gumma of his testes and an ulcerating syphilide on his back developed. The gumma had gone and the ulcers had scarred seven days after a dose of "Hata." There was no recurrence of the nervous complications.

Old cases also benefit. A woman in a deplorable condition, with a deep ulcer on the perineum, caused by syphilis contracted in 1905, had benefited little from much mercury, iodide, and Röntgen ray therapy. A fortnight after an injection of "606" the ulcer, which was originally

15 cm. long and 2 cm. deep, had become greatly reduced in size. Cicatrisation was perfect five weeks later.

In another sufferer from old-standing malignant syphilis, absolutely intractable to the usual remedies, there was extensive destruction of the fauces, serpiginous ulceration of the thigh and scalp, nodes, and phagedenic sores on the penis. Twenty-six days after an injection of "Hata" the lesions had become repaired. Pemphigus in infants, the subjects of congenital syphilis, has hitherto been almost invariably fatal. Two out of five treated with "606" survived.

Michaelis [3] reports similar successes in malignant syphilis. He looks upon "606" as being the greatest pharmacological discovery since the introduction of quinine, and he notes that the discovery was made by systematic research and not by good fortune. He has employed it in 71 cases without noticing any evil results.

Pick [12] has an experience of 126 cases. He is astonished at the rapidity of its action. He considers it the best remedy for lues whether benign or malignant.

Spiethoff [13] has seen phagedæna of the glands disappear in a week, phimosis and enlarged glands subside in a few hours. He reports on 50 cases.

H. Loeb [4] states, as the result of his own experience, that we possess in "606" a remedy which attacks exclusively the *Spirochæta pallida* without damaging the tissues of the body, and that this substance surpasses all other anti-luetic agents in the rapidity and thoroughness of its action.

Treupel [5] has no doubts of the almost magic action of "Hata." Secondary lesions often disappear in two days.

A. Gluck [6] has treated 109 cases with "606." Cleaning of ulcers and softening of induration and of glands are apparent after twenty-four hours. Early secondaries vanish in three to five days. Lichen aggregatus and condylomata disappear completely within a week.

The greatest living authority on syphilis, Neisser [7], in conjunction with Kuznitzky, has given a pronouncement on the subject which must carry great weight. They mention that though arsenophenyl-glycin has afforded good results, yet it has a greater affinity for trypanosomes than for spirochætes. They have injected "Hata" in 126 cases and they find that the substance is very highly spirochætetrope, and is strikingly feeble in organotrope properties. In almost every instance where manifest syphilis existed the lesions subsided in a startling (*verblüffenden*) manner. Primary sores lose their hardness and heal. Treponemata in chancres and condylomata disappear in twenty hours. Macular and papular eruptions become stains only in a day or two. Mucous patches go; shotty glands soften and subside; gummata melt away; tertiary ulcers of malignant syphilis clean and are cicatrised in a few days. The paralyzes and pains of cerebral lues disappear, sometimes in an hour or so.

*A priori* Neisser would have believed it impossible that these infiltrations could be absorbed with such rapidity. In short, the specific action of "606" is undoubted. What before was possible only by means of long and intensive treatment with mercury and iodides can now be attained in a few days.

The influence of the new remedy in changing a positive Wassermann reaction into a negative is marked. Neisser observed this in 44 per cent. of his cases; though if the more sensitive Stern's test was applied, 19 per cent. only became negative. Gerome found negative reactions in 60 per cent. of his cases treated with "606"; Schreiber in 80 to 90 per cent., and Wechselmann in 100 per cent. The earliest change noted occurred thirteen days after the injection. Generally twenty to thirty days must elapse before the serum gives a negative response. In Lange's experience, 57 per cent. of 268 cases reacted negatively four to five weeks after the treatment.

Each dose of "Hata" is contained in a glass capsule sealed *in vacuo*. It is in the form of a strongly acid dichloride. The method adopted for the preparation of the emulsion at the Military Hospital, Rochester Row, S.W., is as follows: 0.6 gramme of "606" is shaken into 30 cc. of sterile water heated to 50° C., contained in a sterile vessel. Solution is effected with the end of a glass rod; 6 cc. of  $\frac{1}{2}$  NaOH are slowly added—a lumpy precipitate falls which re-dissolves in the excess of the alkali.  $\frac{1}{2}$  acetic acid, prepared by mixing 1 cc. of glacial acetic acid with 16.6 cc. of sterile water, is dropped in till neutrality is restored—some employ phenol-phthalein, and others litmus as the indicator; 3.25 cc. is the theoretical amount of  $\frac{1}{2}$  acid required. The dioxy-diamido-arsenobenzol is again precipitated; but this time in a very fine form, which can pass with ease through the needle of the syringe. By using the exact quantities given above, the "606" becomes suspended in a solution of sodium chloride and acetate, which is isotonic with physiological saline fluid; pain is thereby avoided. The whole is then injected either into the glutei (Michaelis and Neisser) or subcutaneously beneath the scapula (Wechselmann). The sciatic nerves should be avoided. The pain of the injection is trifling at the time, but shortly afterwards may be severe. On the third or fourth day it may be aggravated by the infiltration which is produced. Warm baths and fomentations may relieve this, but morphia is sometimes required. Michaelis insists that the patients should remain in bed two days, but Neisser says that many experience so little discomfort that this is unnecessary. A few hours after the administration, rigors, vomiting, and pyrexia, 39.5° C. to 40° C., are observed. These symptoms, however, soon pass off. Neisser states that 2,500 patients have been treated with "606" without any bad symptoms other than those described. Disorders of vision and optic atrophy, which have caused the disuse of arsacetin, have never been observed. Bohac and Sobotka [8] noted retention of urine and constipation for some days

in three cases, but Ehrlich [9] ascertained that 132 capsules of the same supply of "606" sent out to five different clinicians caused no similar effects. Hence it may be concluded that "606" in a dose of 0.6 gramme is harmless.

Schreiber [10] has recommended intravenous injection. But Ehrlich thinks that it is desirable that the compound should be fixed in the muscle or subcutaneous tissue. He [14] states that "606" should not be given in advanced degenerations of the nervous system.

Neisser advocates the use of "606" in every case of syphilis where no contra-indication exists. A review of the evidence before us would lead us to believe that we have entered on a new era in the treatment of syphilis.

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### A CASE OF ENTERIC FEVER WITH COMPLICATIONS; OPERATION; RECOVERY.

BY CAPTAIN W. W. BOYCE AND LIEUTENANT A. G. WELLS.  
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PRIVATE E. was admitted to the Station Hospital, Lahore Cantonment, on January 18th, 1910, with symptoms of enteric fever. On the 20th some blood was taken for a bile test, and on the 23rd the test was reported "positive." On the 24th a few spots were noticed, and the abdomen, previously retracted, showed some distension. From this date to the 30th the disease ran a normal course, the temperature gradually falling, till on the latter date it remained 98.4° F. all day. Towards evening on the 31st the patient complained of pain and passed a motion containing a little blood. The pain was colicky in character and came on gradually, but there was no local tenderness or rigidity in the abdomen and no

tympanites. The temperature ran up from 98° F., till at 8 p.m. it was 103° F., but by midnight it was again normal, the pulse being 94 and strong. The possibility of perforation was considered, but the patient's general condition and the absence of tenderness and rigidity seemed against it. Twenty drops of tinct. opii were given and the patient passed a quiet night.

The next day, February 1st, the patient's condition was quite good, there being no pain, but the evening temperature was 102° F., pulse 108. The bowels did not act all day.

On February 2nd and 3rd the improvement was apparently maintained, the temperature again falling to and remaining normal. The pulse was 90, and no pain was complained of, the patient sleeping well. The bowels did not act.

On the morning of February 4th there was marked distension all over the abdomen, with tympanites, but no rigidity or local tenderness anywhere. The liver dulness was lost for about the last three ribs in the axillary line, but rose to a corresponding degree above. Two glycerine enemata were ordered and resulted in the passage of some hard masses of fæces. A rectal tube was also passed and some flatus drawn off. Next day the distension was still marked, although there was less pain. As the quantity of urine passed was very small (8 ounces in twenty-four hours) a catheter was passed, but only 4 ounces of urine resulted. The glycerine enemata were repeated and turpentine was given by the mouth and used also as stupes. The temperature was 99° F.; pulse 84.

On February 6th and 7th the improvement was maintained, the distension gradually becoming less and the bowels moving freely without enemata. On the 7th and again on the 8th the temperature rose to 101° F., but the pulse remained quiet.

On the 10th the temperature was normal, but there was some return of the colicky pains and the patient had not slept well. The bowels acted four times.

During the 12th he complained of great pain. The distension was very marked and the liver was further displaced upwards, but there was no rigidity or tenderness anywhere. The pulse was somewhat more rapid, but strong. Some peristaltic movements could be seen outlined on the surface of the abdomen. The bowels did not act naturally, but were twice moved by enemata. Urine was passed freely. His temperature remained normal. On the 13th the patient's condition was much the same as the day before, but the pain was less. His temperature still remained normal; pulse 84. The bowels did not act. Morphia was given hypodermically and in the evening the patient reported himself much better. At no time was there any vomiting.

On February 14th I saw him at 7 a.m.; the pulse was 112, small; temperature normal. The case was now one of intestinal obstruction, the colicky pains being very severe and the peristaltic movements of the

bowel could be distinctly seen. The patient's condition appeared to call for immediate operation, so Lieutenant Wells, R.A.M.C., saw the case with me and decided to operate at once. He describes the operation as follows :—

*Operation.*—I saw the patient with Captain Boyce, R.A.M.C., on the morning of the 14th, and from his condition we decided to operate at once. The patient was taken to the theatre and anæsthetised with chloroform. The skin was prepared in the ordinary manner and afterwards painted with tinct. iodi. The abdomen was opened by an incision 5 inches long in the middle line below the umbilicus. On incising the peritoneum no gas escaped and no fluid was seen. The small intestine was greatly distended and in a condition similar to that found in a case of strangulation : there was no peristalsis noticed in the distended portion. On attempting to examine the intestine towards the right iliac fossa, I found the coils of gut in the hypogastric and iliac regions firmly bound to one another and to the parietal peritoneum by adhesions and covered by a plastic exudation. Owing to this condition and to the fact that the patient was extremely collapsed, I did not attempt to search further for any constriction or possible perforation.

I then packed off a distended loop of gut with aseptic gauze wrung out in warm sterile salt solution, and made a small opening into it. A considerable quantity of foul-smelling gas and some brownish fluid escaped and the loop of gut collapsed. I then closed the opening with Lembert sutures and the distension being only slightly diminished I brought up another loop of gut, as near as I could judge, close to the end of the ileum, and anchored it to the parietal peritoneum by four sero-muscular stitches. I then closed the external wound above and below the piece of gut, suturing layer by layer, leaving some pint or pint and a half of warm sterile salt solution in the peritoneal cavity.

As it appeared imperative from the patient's condition that the distension must be relieved at once, and no Paul's tube being available, I opened the gut and inserted a rubber tube, fixing it in position by two sutures into the skin. A large quantity of gas and brownish faecal matter escaped at once. The end of the tube was then closed with a stopcock, and the wound having been painted with tinct. iodi., was dressed with aseptic gauze and a firm bandage applied, the rubber tube being left outside the dressings. This was afterwards connected up with another long rubber tube reaching into a vessel under the patient's bed.

During the operation the patient showed signs of collapsing and injections of strychnine and ether were given, and also a pint or pint and a half of saline solution was injected intravenously.

In the evening, after the operation, the patient's condition was very good and he said the pain was much less, the temperature was normal, pulse 112 and good. He was kept on plain milk, with a little brandy, in small quantities at frequent intervals and, as it was impossible to be

certain as to the exact position of the coil of bowel opened, rectal feeding was adopted as well. It was found that there was a considerable amount of leakage where the tube joined the bowel, necessitating frequent dressing, and to prevent ulceration of the skin round the wound the skin was thickly smeared with lanoline, with the object of protecting it as much as possible. This was done at every dressing, and the result was very satisfactory, as never at any time did the skin give the slightest trouble.

The patient passed a quiet night, sleeping fairly well, and there was little or no pain. Several pints of fluid passed through the tube during the twenty-four hours. There was a rise of temperature to 99.2° F. in the evening, which was the last rise above normal during the course of the case.

On the 16th, all pain and distension had quite disappeared and the food was increased, three eggs beaten up, and sanatogen, 2 teaspoonfuls being given thrice daily. The tube was working well, but apart from this the bowels were acting freely.

From the 18th onwards the matter passing through the tube became curd-like and, as the lower section of the tube frequently became blocked, it was removed and a short length allowed to empty into a bottle in the bed. The passage of greenish curds through the tube seemed to indicate that the bowel had been opened rather higher up than was at first thought; but against this is the fact that the patient's nutrition was in no way interfered with.

On the 20th the rectal feeding was stopped and essence of chicken given by the mouth. On the 22nd the tube was removed and a pad applied and the next day the skin sutures were removed.

From this time onwards the patient's recovery was quite uneventful; food was gradually increased till six weeks after the operation the patient was on ordinary diet with extras, and was quite as well nourished, if not better, than on admission to the hospital.

The wound gradually healed, and now, at the time of writing, nothing remains but a small faecal fistula which is rapidly becoming smaller. An operation to close this fistula was considered but thought to be unnecessary.

The case appears to have been one in which deep ulceration caused infection to spread through the bowel to the peritoneal cavity leading to chronic plastic peritonitis, which in its turn, owing to the formation of adhesions, caused paralysis, and consequent obstruction of the bowel.

**NICKEL POISONING FROM DRINKING BARLEY WATER.**

BY MAJOR N. FAICHNIE AND LIEUTENANT J. DU P. LANGRISHE.

*Royal Army Medical Corps.*

OF recent years barley water has become a very fashionable hot-weather drink. Some that had been made in the mess of the Inniskilling Dragoons at Mhow was flavoured with the juice of fresh limes and put into a large metal urn having a central chamber for ice. Of this four officers partook at luncheon, and within fifteen minutes all felt very sick. None of them actually vomited, but the desire to do so lasted all day, and in one case till next morning. The same evening the mess serjeant drank half a pint which had remained in the urn all day. Within five minutes he felt extremely sick, but was unable to vomit until he had drunk some brandy, which had the desired effect. A bottle of this barley water sent to the divisional laboratory showed on analysis the presence of nickel. The urn was made of some white metal coated with nickel, and there is no doubt that the citric acid of the lime-juice was the cause of the trouble.

The recognition of the action of acids on metals is important when it is remembered that ration limejuice contains 6 per cent. of citric acid. Further, it has been recently observed by one of us that water-sterilising tablets of acid sodium sulphate, which liberate sulphuric acid when dissolved in water, have a corroding action on metal water-bottles. On examination of the acid contents of bottles made of aluminium, zinc, and enamelled iron respectively, each of these metals was found in solution.

**GASTRIC ULCER WITH SEVERE HÆMORRHAGE.**

BY MAJOR W. D. ERSKINE.

*Royal Army Medical Corps.*

PRIVATE D., West Yorkshire Regiment, was admitted to the Military Hospital, York, on February 15th, 1910, complaining of pain in the stomach and vomiting.

He had been a noted bayonet fighter, and had suffered from what he called "indigestion" since 1904. He was then serving in India, where he stated he had soldiered for twelve years. About the middle of December last, at York, vomiting of stomach contents some time after a meal set in, and he remarked on the burning character of the vomited matter. On January 19th, 1910, while at home on furlough, severe attacks of recurring vomiting of dark-coloured matter, accompanied by melæna, prostrated him, and necessitated the calling in of a doctor.

When the symptoms abated he came into hospital direct from his father's house. There was evidence of a painful spot in the stomach wall in the outer third of the epigastric region, with rigidity of the rectus muscle over it. He was put to bed and given milk only as a diet. At mid-

night on March 1st there was an alarming and profuse hæmatemesis, the vomited matter being like coffee grounds in colour; altogether  $1\frac{1}{2}$  pints of altered blood were thrown up. He was put on small feeds of milk and egg albumen only. On March 2nd melæna was present. On March 4th, as the result of an enema, a large stool, for the most part pure blood, came away.

SUMMARY OF DAILY DIETARY IN THE CASE OF PRIVATE D., WEST YORKSHIRE REGIMENT, (GASTRIC ULCER WITH SEVERE HÆMORRHAGE.)

Day of treatment	Eggs	Chicken	Bread	Beef	Mutton	Tripe and onions			Hot water	Normal Horse serum	Remarks
	Number	oz.	oz.	oz.	oz.	oz.			oz.	c.c.	
1st ..	1	2	2	..	..	..	..	..	30	60	Yolk of eggs only. Beef, mutton, and chicken pounded.
2nd ..	2	2	2	..	..	..	..	..	30	75	..
3rd ..	1	4	2	..	..	..	..	..	30	75	..
4th ..	2	4	1	..	..	..	..	..	30	75	..
5th ..	3	4	4	..	..	..	..	..	30	75	..
6th ..	4	3	5	..	..	..	..	..	30	75	..
7th ..	3	6	5	..	..	..	..	..	30	75	..
8th ..	4	3	6	1	..	..	..	..	30	75	..
9th ..	3	6	6	6	..	..	..	..	30	40	..
10th ..	3	..	5	..	6	..	..	..	30	40	..
11th ..	3	..	6	..	8	..	..	..	30	40	..
12th ..	3	..	6	2	6	..	..	..	30	40	..
13th ..	3	..	6	2	6	..	..	..	30	40	..
14th ..	3	..	6	4	8	..	..	..	30	40	Whole eggs taken. Beef, mutton, and chicken minced.
15th ..	3	5	5	5	3	..	..	..	30	40	..
16th ..	3	5	6 $\frac{1}{2}$	5	5	..	..	..	30	40	..
17th ..	3	6	2 $\frac{1}{2}$	6	5	..	..	..	30	40	..
18th ..	3	3	6 $\frac{1}{2}$	6	6	..	..	..	30	40	..
19th ..	3	6	7 $\frac{1}{2}$	6	6	..	..	..	30	40	..
20th ..	3	6	7 $\frac{1}{2}$	6	6	..	..	..	30	40	..
21st ..	3	6	8	6	6	..	..	..	30	40	..
22nd ..	3	6	8 $\frac{1}{2}$	6	6	..	..	..	30	40	..
23rd ..	2	6	8 $\frac{1}{2}$	..	6	6	..	..	30	40	Mutton cutlet now taken.
24th ..	2	6	8 $\frac{1}{2}$	..	6	..	..	..	40	40	..
25th ..	2	6	8 $\frac{1}{2}$	..	..	6	..	..	40	40	..
26th ..	2	6	12	..	6	6	..	..	40	40	..
27th ..	2	6	12	6	6	6	..	..	40	40	Beef steak now taken.
28th ..	2	6	12	6	6	6	..	..	40	40	Weight 9 st. 4 lb.
29th ..	2	6	12	6	6	6	..	..	40	40	Beef steak with spinach.
30th ..	2	6	12	6	6	6	..	..	40	40	..
31st to 34th	2	6	12	6	6	6	..	..	40	40	Weight 10 st. 1 lb.
35th to 40th	2	6	16	6	6	6	..	..	40	40	Weight 10 st. 10 lb.

On March 5th, at 2 p.m., he had a smaller hæmatemesis than that noted above, but accompanied by alarming collapse and blanching. All feeding by mouth was stopped, and chloride of calcium given *per rectum*.

On March 6th he was fed by meat enules every three hours; at 6.45 a.m. another hæmatemesis occurred, and he vomited about 1 pint of red blood. At 11.30 a.m. he vomited the same quantity of altered blood. Liq. adreninæ hydrochlor., B.P., was administered by mouth. Melæna was present between the 7th and 16th, and hæmatemesis on the 7th.

On March 16th hæmatemesis occurred again, and as a result of the bleeding from the mouth and rectum the patient was now in an extreme state of exhaustion and emaciation. He was, in fact, on the point of death. Arrangements had been made to obtain a supply of fresh normal horse serum, and at 11 a.m. on this date he was put on Hort's treatment; as detailed in the *British Medical Journal* of October 10th, 1908, page 1080. A synopsis of the daily diet is given. The patient responded to the treatment at once. With the exception of a large quantity of blood-stained mucus which came away after an enema on March 20th, signs and symptoms entirely disappeared. On April 12th he weighed 9 st. 4 lb., his proper weight being 11 st.

On April 26th his red blood corpuscles numbered 3,500,000 per c.mm. On May 31st he was discharged on two months' sick furlough, weighing 11 st. 5 lb., having been on full ordinary diet for thirty-six days. This diet was amplified by extras of tripe and onions, spinach, bacon, milk, eggs, and pork chops. He was told to avoid fish, alcohol, tea, coffee, and starchy puddings for six months. A count gave his red blood corpuscles as 5,500,000.

Dr. Hort, in his article of January 8th, 1910, *British Medical Journal*, states that he will not consider a cure effected till three years have elapsed. I shall endeavour to keep in touch with this man for that time. After experience of the old and Lenhartz methods of treating this affection, I consider Dr. Hort's method more pleasant from the patient's point of view, and more satisfactory to the physician treating the case.

### A CASE OF HEPATIC ABSCESS.

BY LIEUTENANT C. CLARKE.

*Royal Army Medical Corps.*

THE following brief notes of a case of liver abscess, treated at Dover Military Hospital, may be of some interest owing to the length of time which elapsed between the attack of dysentery and the development of a liver abscess.

Rifleman T., Royal Irish Rifles, was admitted into hospital June 3rd, 1910, suffering from pain and enlargement of the liver, and with signs of congestion at the base of the right lung.

An exploring needle located pus in the right lobe of the liver. A large hepatic abscess was then opened and drained through an incision in the anterior axillary line,  $1\frac{1}{2}$  inches of the 9th rib being resected for this

purpose. The discharge of viscid blood-stained pus was profuse for a few days after the operation, but it soon diminished in quantity, becoming serous in character and practically ceased at the end of three weeks. The patient then made an uninterrupted recovery.

Films of the pus were prepared a few days after the operation, fixed in absolute alcohol, and stained. Leucocytes, red cells, and several large granular cells, two to three times the size of an ordinary pus cell, and closely resembling amœbæ, were seen. The majority of these large granular cells were in a state of disintegration, but in the better preserved specimens one could see protoplasm, a nucleus, and also what appeared to be vacuoles and ingested particles.

The previous history of the case was as follows: He had a severe attack of dysentery at Calcutta in December, 1899, when he was in hospital for about a month, with the passage of much blood and mucus *per rectum*. He made a good recovery from this attack, and but for a few minor ailments has remained in good health and free from all signs of dysentery ever since. In June, 1910—that is ten and a half years after the attack of dysentery in India—a typical hepatic abscess developed and ran a normal course.

## THE PREVALENCE OF MIDDLE-EAR DISEASE IN THE ARMY, WITH A SUGGESTION FOR A REMEDY.

BY CAPTAIN B. B. BURKE.

*Royal Army Medical Corps.*

THE extent to which disease of the middle ear prevails in the Army, and the loss of efficiency for which it is responsible, both by invaliding and hospital admissions, is hardly flattering to a corps which is maintained "firstly with a view to the prevention of disease."

It is with the object of drawing attention to this subject generally, and more especially the attention of those officers who have still to undergo the ordeal of the "Captain's Course," and are, perhaps, not certain which subject they will select for special study, that I am tempted to write this article.

Major F. W. Porter,<sup>1</sup> has already pointed out the fact that a considerable number of recruits are annually passed into the Army already suffering from middle ear disease. My own experiences amply confirm this fact, and it is for this reason that I think middle ear disease (as far as the Army is concerned) should be included under the heading of Preventable Diseases.

Lieutenant-Colonel Cottell,<sup>2</sup> taking\* the fresh cases of invaliding

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<sup>1</sup> "A Plea for the more Careful Examination of the Soldier's Ears on Enlistment," JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, April, 1908.

<sup>2</sup> "A Plea for the Employment of Aurists in Connection with Recruiting," *Ibid.*, May, 1910.

for all diseases that came before the Chelsea Commissioners during the first three months of 1909, found that out of 743 cases 62 were invalids for deafness. Thirty-four of these cases gave a history of having had ear disease before enlistment.

The following analysis of the cases admitted for ear disease to the Military Hospital, Devonport, during the years 1908 and 1909, shows that inflammation of the middle ear is responsible for the majority of admissions under the above heading. I have bracketed together *inflammation middle ear* and *perforation membrana tympani*, as it is difficult to conceive, except in the case of injury, how a perforation of the membrana tympani can be present without coexisting latent or active suppurative otitis media. The converse is frequently the case in catarrhal inflammation of the middle ear, but only very occasionally in suppurative inflammation, and that more especially in children.

TOTAL CASES OF EAR DISEASE ADMITTED TO MILITARY HOSPITAL, DEVONPORT,  
DURING 1908, 47. STRENGTH OF GARRISON, 3,093.

Type of Disease	Number of Cases				Invalided
Inflammation external meatus .. ..	11	..	..	..	1
Inflammation middle ear .. ..	15)	29	..	..	8
Perforation membrana tympani .. ..	14)	..	..	..	..
Rupture membrana tympani .. ..	2	..	..	..	—
Accumulation of wax .. ..	1	..	..	..	—
Deafness .. ..	4	..	..	..	1
Total .. ..	47	..	..	..	10

TOTAL CASES OF EAR DISEASE ADMITTED DURING 1909, 48.  
STRENGTH OF GARRISON 3,285.

Type of Disease	Number of Cases				Invalided
Inflammation external meatus .. ..	12	..	..	..	—
Inflammation middle ear .. ..	31)	34	..	..	1
Perforation membrana tympani .. ..	3)	..	..	..	..
Accumulation of wax .. ..	1	..	..	..	—
Obstruction of Eustachian tube .. ..	1	..	..	..	—
Total .. ..	48	..	..	..	1

The figures for 1908 have been taken from the admission and discharge book; in 1909 all the cases, except 3, came under my personal observation.

It can be seen that for both years the majority of admissions are for middle ear disease, and that this type of ear disease is responsible for almost all the invaliding.

In 1908, 25 out of the 29 cases of middle ear disease were in men who had under eighteen months' service, and 13 out of these 25 had under six months' service.

In 1909, 31 out of 34 cases admitted, who came under my direct observation, were subjected to careful investigation and examination. Of these 31 cases 6 were primary attacks of acute suppurative otitis media following influenza, tonsillitis, &c. Twenty-five were cases of chronic

suppurative otitis media, all of whom gave a history of having had a discharge from the ear prior to enlistment; while in 18 of the latter there was clear and unmistakable evidence that active disease was present at the time of their enlistment.

As regards length of service, 15 cases had six months' service and under, 10 cases eighteen months' service and under.

So far, I have been dealing with the cases returned under the heading of middle ear disease, but one must also take into account the loss to the Army by death and invaliding from the complications of middle ear disease. It is impossible to estimate this loss, which few will deny exists, as these cases are invariably returned under the heading of the most serious disease—*e.g.*, meningitis, abscess of brain, lateral sinus thrombosis, &c. Other diseases such as pneumonia and diarrhoea may also occur as sequelæ of middle ear disease.

Preysing<sup>1</sup> gives the results of *post-mortem* examinations on 100 children, whose ages varied from 1 day up to 3 years, and who had died from various causes. Of these 81 showed middle ear disease, which was bilateral in 73. Bacteriological examination brought out the fact that by far the most common organism present was the pneumococcus. Out of 121 positive results Preysing<sup>1</sup> found the pneumococcus present in 112. He also lays stress upon the association of diarrhoea with middle ear suppuration.

It is not improbable that an unprotected "discharging" ear, scattering its bacilli broadcast in a barrack-room, might be responsible for some of the so-called barrack-room sore throats.

The figures for the Devonport Garrison, given above, taken in conjunction with those for the Colchester Garrison, quoted by Major Porter, show that a considerable amount of middle ear disease could be prevented from gaining an entry into the Army. The question is, How is it to be done?

Our first line of defence is the recruiting medical officer's examination. I agree with Major Porter that it is quite impracticable on account of the time required, especially at large recruiting stations, to clean out and examine by speculum the ears of every prospective recruit, even supposing the recruiting room was efficiently equipped with the necessary light and instruments, and that the medical officer was accustomed to work of this kind. Very obvious cases can, of course, be detected by simple tests—such as Major Porter suggests—though I have seen a recruit of forty-eight hours' service with an aural polypus protruding from the external meatus.

It is not always an easy matter to detect certain types of middle ear disease. In my experience a fair percentage of the cases that are enlisted are men with a very small perforation, situated in the upper part of the

membrana tympani (Shrapnell's membrane), with a scanty discharge from the meatus. Cases of this type are extremely chronic, and present a certain amount of difficulty even to the skilled observer working with a good artificial light and special instruments. Again, owing to anatomical variations, some cases present considerable difficulty in the way of a complete examination.

We must, therefore, face the fact that, unless every recruiting medical officer is a skilled aurist, having the time and necessary instruments at his disposal, which is obviously impracticable, these cases, so common amongst the class from which our recruits are drawn, must frequently get through our first line of defence. For example, Cheatile, examining 1,000 school children, found that 335 of these had a discharge from one or both ears.

Recognising this fact, we must fall back on our second line of defence and adopt means to prevent any man suffering from middle ear disease completing three months' service. This will entail the ears of every recruit being thoroughly examined by a skilled aurist at some period or other during his first ten weeks of service, and the fact noted in his medical history sheet.

Unfortunately, the number of medical officers who specialise in otology, with laryngology and rhinology, is very small; I do not think there are a dozen in the whole Corps who have qualified in this subject since the Captain's Course was instituted.

Until we can command the services of a sufficient number of officers accustomed to examining ears, the method indicated above must remain as an ideal to be aimed at. As a preliminary step towards attaining this ideal, officers must be encouraged to take up the study of ear diseases, and accustom themselves to working with a forehead mirror and artificial light.

I would suggest as the best means to this end that ear, nose, and throat departments, under the charge of a specialist, should be established at all military hospitals of 200 beds and over. Ample clinical material will be found amongst the men, women, and children.

There is a large field of work in these diseases in the Army, which is hardly touched upon at present. All junior officers could be attached for instruction at the same time as they are going through the company office. Details, such as the most suitable hours for the clinic, &c., could be worked out by the medical officer in charge of the department in conjunction with the officer in charge military hospital, and the medical officer in charge of families. A number of these departments would operate for the good of the Army in many ways. They would be a great boon to the women and children who, except in two or three stations, are almost entirely dependent on civil hospitals for treatment in throat, nose, and ear diseases. A large number of the chronic middle ear cases, who often spend on an average thirty to fifty days in hospital, could be efficiently treated as out-patients, with a considerable saving to Govern-

ment. They would also afford prospective specialists the opportunity and means of working up their subject; while the prospect of eventually holding the charge of such a department would encourage many officers to take up the study of these diseases.

It would not entail much expenditure to carry out such a scheme as I have indicated; the principal item would be the necessary equipment, a certain amount of which is already available in the various medical and surgical stores and district loan equipment, while the eventual saving to the Government would be very large.

In conclusion, I would like to draw attention to a leading article, entitled "The Development of Specialism," which appeared in the *British Medical Journal* of April 16th, 1910. A Guy's Hospital committee pointed out that in the case of diseases of the ear and throat such special skill in the use of instruments for diagnosis and operative procedure is necessary, that it can hardly be expected of one who is also a general surgeon.

## A VISIT TO THE PARIS RADIUM INSTITUTE.

BY MAJOR F. J. W. PORTER, D.S.O.

*Royal Army Medical Corps.*

FOR the past month I have been privileged to attend this Institute, and to see a good deal of the excellent work which is being done. It has occurred to me that a short account of what I have seen may be of interest to readers of the Corps Journal.

The Laboratoire Biologique du Radium (to give its proper title) was opened at 41, Rue d'Artois, on July 1st, 1906, as the practical outcome of eighteen months' previous work with radium by Dr. Wickham. It is about five minutes walk from the Arc de Triomphe, and is in a large private house, three rooms of which are devoted to a laboratory of physics, one to chemistry, and two to histological work.

There are places for experiments on animals, and a workshop for the manufacture of filters and of peculiarly shaped carriers, which are frequently necessary to carry the radium applications into awkward places.

There is a number of waiting rooms for treatment of patients, but no beds are available. One English and two French nurses are busily engaged in attending to the patients, and very careful records of all cases are kept by the two secretaries who are employed. Every case is photographed, and colour photography is extensively used. Two other doctors also assist in the treatment of the out-patients.

All researches connected with surgical pathology are conducted by Dr. Louis Wickham, whilst Dr. Dominici is concerned with the medical aspect of the work. Since the opening of the Institute, Dr. Degrais has

been Dr. Wickham's right-hand man, and has rendered him valuable assistance.

The enterprise is entirely of a private nature, and the amount of radium which is available for treatment is valued at 200,000 francs. This has been supplied from the works of M. Arnet de Lisle; it is equivalent to about 50 centigrammes of pure radium.

Up to the present time Dr. Wickham has treated gratuitously about a thousand non-paying patients at the Institute; of these about a hundred have been English or American. The daily attendances at present average about thirty patients, and the patients are seen by Drs. Wickham and Degrais at 4 p.m., on Mondays, Wednesdays, and Fridays. Both these gentlemen speak English, and they take a great deal of trouble in explaining the methods of treatment to those medical men who happen to be present.

The work is being carried on in a very unostentatious manner, and beyond periodical communications to medical societies and journals, no publicity is given to it.

One is struck by the truly scientific spirit in which Drs. Wickham and Degrais estimate the possible value of radium as compared with other methods of treatment, *e.g.*, X-rays, or Finsen light, for any particular case. They are also most anxious to avail themselves of surgical help, whenever it is considered to be for the patient's benefit.

#### APPARATUS NOW IN USE.

(1) *Sealed glass tubes*, containing pure radium sulphate, are enclosed in silver or lead tubes. These are useful for introducing into solid tumours, or into natural or artificial orifices in order to reach growths, or in gynaecological work.

(2) *Apparatus with a metallic base* (usually of copper), and sufficiently thick to be rigid. They vary in size and shape, and contain a special varnish in which the radium sulphate is mixed.

(3) *Toile applicators*, which consist of cloth covered with radium varnish.

#### TECHNIQUE PROPER.

All the applicators are protected by sheet rubber. Filters of lead and aluminium of different degrees of thickness, and sheets of black paper, are made use of, according to whether it is desired to eliminate certain rays or not. By means of these screens the radiations given out by any given apparatus can be varied to any extent.

Healthy skin can also be protected in this way. The strength of apparatus and duration of exposure depend on the disease which is being treated, and cannot be entered into within the limits of this short paper; but what impresses one in this method is the ease with which the apparatus can be applied, the entire absence of pain and discomfort, the quiet, and entire absence of all fuss.

## THERAPEUTIC RESULTS.

*Carcinomata*.—I have seen a large number of carcinomata of the skin (of the variety which we call "rodent ulcers") under and after treatment. The results are extraordinarily good, and the scars are quite perfect. The convenience of application, entire freedom from pain, and absence of all constraint, which are features of this form of treatment, must appeal especially to one when dealing with this disease, which so often attacks old people. I have also seen cases in which recurrence of disease in the glands of the neck, considered to be inoperable by English surgeons, had been treated with great success. In one of these there appeared to be no return at the end of seven months.

In cases such as epitheliomata of the lip, Dr. Wickham prefers first to act on the growth and its surrounding, and after removal by the surgeon, to make further applications over the scar. He believes in this way that it is possible to do a great deal towards preventing recurrences. He also thinks that the want of success in dealing with carcinomata of the mouth is due to the fact that apparatus containing 50 centigrammes to 1 gramme of pure radium sulphate are not at present available for the purpose of making the short but powerful exposures which are probably necessary in these cases.

For hopeless cases of ulcerating neoplasms radium is capable of affording great relief. It causes a diminution of pain and hæmorrhage, and the offensive odour disappears. This amelioration of symptoms is surely worth a great deal to these unfortunate patients.

All through Dr. Wickham's work and writings one is impressed by his anxiety that he should not be misunderstood regarding what he believes to be the possibilities of radium in the treatment of this terrible disease.

*Cheloids*.—Drs. Wickham and Degrais have since 1908 proved that radium has a most wonderful action on these. Under its influence the raised tissue melts away, and it is possible to fold the epidermis where the cheloid had been situated. It has also a marked action on the scars which result from neglected tuberculous glands.

*Angiomata*.—These disfiguring affections form a large proportion of the cases one sees at the Institute, and the way they yield to radium is very striking. In extensive cases the treatment often extends over many months, and the exposures are made in series, with long intervals. The quiet and absolutely painless action of the radium affords a marked contrast to X-rays and electrolysis, and is wonderfully adapted to the treatment of infants.

The treatment is also specially suited to hairy nævi which are thick and deeply coloured and have a rugous surface.

*Tuberculosis of Skin and Mucous Membranes*.—Radium is very valuable in these cases, especially when used in combination with Finsen, cauterisation, or scarification.

*Pruritus Ani*.—This exceedingly common and troublesome affection can usually be successfully treated by radium.

In chronic *Eczema* and *Neurodermatitis* it is often of great use. Dr. Wickham tells me that he has used this remedy in a number of gynaecological cases, and he has a high opinion of its capabilities in many directions.

In conclusion, I would say that a visit to this Institute is well worth making, and visitors may be certain of a welcome from its directors.

## NOTES ON A NEW GRAVIMETRIC METHOD FOR THE ANALYSIS OF MILK.

BY SERJEANT E. B. DEWBERRY.

*Royal Army Medical Corps.*

AN interesting paper, dealing with a "New Gravimetric Method for the Analysis of Milk," was read by Mr. Richard Moss, F.I.C., F.C.S., before the Royal Dublin Society, at Leinster House, Dublin, on May 24th, 1910, in which he demonstrated that the method would not only save considerable time, but would also tend to quicken the process in estimating the total solids and solids-not-fat.

The main features of the paper are as set out below :—

(1) Platinum dishes are replaced by sheets of "pure tinfoil," cut into suitable pieces, say about 4 inches by 3 inches. The tinfoil, however, must not be too thin.

(2) The drying of a large coil of fat-proof paper, which takes some time to dry, is altogether dispensed with.

(3) The introduction of an apparatus for drying the coil, by which considerable time is saved.

Two pieces of pure tinfoil, measuring 4 inches by 3 inches, are taken and flattened out on clean paper. A piece of wood  $3\frac{3}{4}$  by  $2\frac{3}{4}$  inches is then placed on one side of the pieces of tinfoil, and with the aid of the back of a knife, or some blunt instrument, the margin thus made (*i.e.*,  $\frac{3}{8}$  inch) is turned up all round the wood, so as to form a dish. The wood is then removed, and the corners of the dish slightly sloped outwards, so that they would be identical with the spout of an ordinary porcelain photographic dish. The second piece is dealt with in precisely the same manner, the sides being pushed out a little further, in order that when the latter is placed over the former it forms a sort of lid. The dish and cover are now dried for a few minutes in a water-oven, and afterwards placed on the scale pan, and accurately weighed; the lid is then removed and 5 cc. of the milk sample (which has been previously well mixed) pipetted into the dish on the scale pan; the lid is quickly replaced and the weight of the milk noted. The dish and cover are carefully removed

from the scale pan, and placed on the *top* of the water oven, which should be perfectly level—the lid is removed, and placed by the side of the dish—and left for half an hour to dry. After the solids are fairly dry, the edges of the dishes can be turned down to the original flat piece of metal.

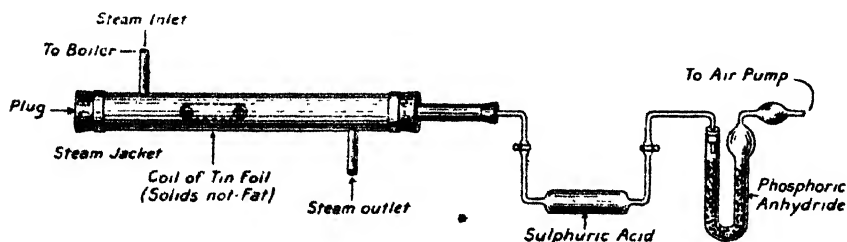
In some instances, Mr. Moss placed a small piece of tinfoil in the dish, and weighed the two together. This piece of tinfoil is used as a spoon, by which some of the milk can be lifted from the dish and put into the lid to dry, thus giving a much larger drying area; the spoon is afterwards put back into the dish.

After the milk has been dried for the allotted time, the two dishes are placed on the bench on a clean sheet of paper. One is then taken and carefully placed on the other, so that the milk-dried surfaces are facing each other. Now the edges are turned over twice about  $\frac{1}{8}$  inch all round and pressed down; care, however, should be taken to see that no solids escape.

A piece of glass tubing with a bore of about  $\frac{5}{8}$  inch is laid on one end of the sheet so made, and a roll is made round the glass. The roll is now taken off the glass tubing and put straight into the Soxhlet extractor, and the fat extracted with anhydrous ether for a period of three hours. The amount of fat is then calculated in the ordinary way. The coil is now very carefully taken out of the Soxhlet apparatus, and dried. This process of drying the solids-not-fat requires some apparatus, as time is again a chief consideration.

The apparatus referred to is shown in the illustration below. It is merely a process in which the coil is dried by being put in a tube which has a steam jacket; the moisture driven off is passed over sulphuric acid and through phosphoric anhydride. Complete drying is ensured by this apparatus in one hour. The coil is then weighed, and the solids-not-fat are calculated.

The process may seem rather complicated in theory, but in practice it is comparatively simple; furthermore, the results obtained are quite as accurate as by any other known method.



If this apparatus is not available, the coil could be dried in a water-oven for two hours.

## Lecture.

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### MEDICAL ARRANGEMENTS IN SAVAGE WARFARE.<sup>1</sup>

BY LIEUTENANT-COLONEL J. D. F. DONEGAN.

*Royal Army Medical Corps.*

#### INTRODUCTION.

THE organization for the treatment, removal, and disposal of wounded in savage warfare must differ somewhat materially from that obtaining under more favourable conditions, where, by mutual arrangement, international conventions, and agreement between belligerents, concessions can be made as regards the disposal of the injured and incapacitated of both opposing forces.

When dealing with savages one can but expect numerous difficulties which must be contended with sooner or later. One thing is absolutely certain—viz., that circumstances alter cases, and that no system of Army medical administration based on civilization, no matter how perfect, could provide for the conditions which are likely to arise. When I allude to savages, I do not wish to infer that our opponents must necessarily be cannibals; I mean by the term, a non-christian religious fanatic fighting for what he considers to be his creed, restrained by no convention or proper form of discipline, expecting no mercy, and prepared to give none.

Such is the foe which we must expect to meet if ever pitted against the coloured races of Northern India, Egypt, the Soudan, or South and West Africa. It requires but a slight stretch of the imagination to realise that an adversary whom I endeavour to depict will not exist under civilised conditions.

More often than not their stronghold, and our military objective, is likely to be a few mud huts, or a cavern in a rock, where one cannot expect to arrange for the disposal of the sick and wounded, as would be possible in a fortified town when once captured.

On the other hand, we must be prepared to arrange for the transport of our disabled comrades back over the line they advanced on, which is hardly likely to be a motor track. As our wounded cannot be left to the mercy of the enemy, their removal from what we describe as the field (more often the pinnacle of a rock or the bed of a river) becomes imperative. Transport to the base of operations with guarded convoys, also precautions against sniping in camp and on the line of march, and fanatical night rushes, must necessarily be a military problem, but at the same time it entails on the part of the medical service the duty of self-defence, protection of those under their care, also a knowledge of the elements of

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<sup>1</sup> Lecture to Junior Officers of the Royal Army Medical Corps.

camp fortification and entrenchment, subjects which, under other conditions, do not form part of its curriculum of education.

There are also climatic conditions to be contended with ; extremes of heat and cold, or at some seasons freezing nights followed by sultry days. Added to these, there is the difficulty of obtaining a proper water supply, as at times its quality becomes a consideration secondary to the more important one of quantity. Scarcity of all domestic comforts, and often bare rations, can only be expected when convoys are delayed as the result of hostilities, or torrential rains, causing landslips and impassable roads.

The corresponding advantages of savage as compared with civilized warfare, from a medical point of view, are few ; in the first place the number of wounded is likely to be less. The force itself is generally small and compact, and the commanding officer is usually permitted to act according to circumstances, without further reference to higher authorities. Medical officers can similarly disregard authorized regulations, and act as they themselves think best under the conditions. It is unfair, however, to cavil at our rules for guidance, because they do not exactly apply. A profound dislike of all regulations (usually accompanied with a masterly ignorance) known as "para-phobia" is by no means a rare affection.

Should our scene of operations be toward the North Pole, where during certain seasons of the year there is an absence of darkness, we should naturally discard our candle lanterns and distinguishing lamps. Though we may find out the conditions which existed in such a land, we should not expect a clerk in the Woolwich factory to be equally conversant ; his duty is to load our panniers according to schedule, ours is to discard what we do not want (acting on our own initiative).

By force of circumstances, the senior medical officer in savage warfare may be very junior in rank, perhaps only an ordinary Lieutenant-Colonel, or even a Major. Whatever his standing may be, he must be prepared to accept the responsibility of acting on his own judgment, under the trying positions which are almost sure to arise. To use a vulgar expression, he must "get the hang of the whole show" ; if ignorant or uninformed of the strategical plans and proposals, his medical arrangements are sure to be defective, if not disastrous. We are aware in peace time that ignorance of orders is no excuse. On service the expression, "I was never told they were going to do this or that," is similarly unpardonable, as it is one's business to find out.

#### DETAILS OF ARRANGEMENTS.

(1) *Feeding*.—Tinned food must form the chief article of diet. Fresh meat may at times be available, but it cannot be depended on as a constant source of supply. Field ambulances, and the patients in them, can often get no more than the troops.

Rum on service is carried in a concentrated form. Whisky and brandy should be similarly carried by medical units, and afterwards diluted as required. As bullets and falls over precipices have an injurious effect on glass bottles, stimulants might well be carried in metal flasks. If cart transport has to be dispensed with and replaced by animals, be they mules, horses, donkeys, camels, elephants, or native carriers, it is not a bad precaution before starting on the expedition to make out a breakage report (Army Form 1230) for any article which can be broken by human power, as it is bound to be required before the termination of hostilities.

As a general rule, in savage warfare one must live on what one can get, do without what cannot be obtained, and exist on hope. Mr. Atkins sets a good example in this respect; even under the most trying conditions he thinks of beer, and talks of beer, and his time-honoured old joke about receiving a quart on reaching camp always produces a laugh, even when things look desperate.

(2) *Clothing*.—The clothing must consist of what is issued to start with, plus and minus what is afterwards added or reduced. Roughly speaking, greatcoats would not be necessary in the Soudan hot weather, and eye fly-nets and sun-hats should, I presume, be just as unnecessary in Canada during the winter. Before leaving the subject of clothing, I take the liberty of adding a few remarks about blanket covering.

When the weather turns cold any suggestion to increase the number of blankets is, as a rule, impracticable, on account of difficulty of transport. One must remember that more blankets means more mules, or other animals to carry them, and still more animals to carry the food to feed the beasts that carry the blankets. On this house-that-Jack-built system one might keep adding to the transport of a column to the extent of interfering with its military efficiency. Acting on the presumption that the weather is cold, and that the blankets are limited to one per man in spite of all the recommendations of the principal medical officer and all the other officers, the thing is, how to keep warm. Every man on service is in possession of a heart, a liver, an identification card, and a water-bottle. Given a freezing night, no pillow but a saddle, no roof but the stars of heaven, no covering but a single blanket, the question is, Can one be comfortable and warm? The answer is "Yes."

The water-bottle can be filled with boiling water before retiring to rest, and used as a bed warmer. It can be worn wherever the sleeper so desires—in the small of the back or nape of the neck—and from personal experience of over two years I can vouch for the sense of comfort and warmth which it produces, and the rapid manner in which it brings about sleep. During the following day the water used for this purpose over night is available for drinking, as the boiling has sterilized it. Though men often object to having to boil water for drinking purposes only, they certainly will not object to doing so if it also means to them warmth and a night's rest. I have tried this experiment with

the ordinary vulcanite water-bottles supplied, and I have never seen them in any way affected even by boiling water.

There is not much more to say about clothing.

Head-gear should be in accordance with local conditions; cholera belts are small and easy to carry, and more useful when worn only at night than all day long in warm climates, where, as the result of perspiration, they are likely to act as a poultice or warm fomentation.

Our present pattern Indian tent cannot well be improved on. When tents cannot be carried they can be improvised by the use of sticks and sugar or grain bags. An excellent armchair can also be made out of a sack and four upright sticks by putting the taller ones behind and the shorter in front, and making fast the sacks to the projecting ends.

#### PERSONAL HYGIENE.

I can say no more on this subject than has been said by experts. The variety of war should not affect the doctrines of ordinary cleanliness; all I can say is, Be clean and teach others to be as clean as possible.

Our text-books tell us that when water is not available such articles of clothing as shirts, socks, trousers, and boots can be cleaned and freed from vermin by being turned inside out and exposed to the sun. This suggestion is dangerous. Camp followers have no objection to vermin, or clothing belonging to others, being bad judges of their own property.

Soap is a most useful commodity indeed, and almost impossible to obtain unless brought from the base. As a matter of fact, I have seen soap growing on trees in the form of nuts, while on some expeditions: however, this form of supply cannot be counted on.

#### SANITATION.

The sanitary precautions laid down for civilized war should be adopted as far as possible, and as each dogma has to be dispensed with by force of necessity, it should be done reluctantly and not with pleasure. Though we may not be able to carry out all, we can at least act on some of the suggestions; a return to mediæval neglect and disregard of the laws of health is sure to be felt.

#### PREVAILING DISEASES.

I speak, of course, subject to correction, but, as far as my experience goes in savage war, I have found dysentery and cholera the most common epidemic diseases; other prevailing affections were sunstroke, heat apoplexy, and ordinary diarrhoea from non-assimilation of food.

Surgically, in addition to gunshot wounds, one is likely to meet with a number of severe contusions, the result of kicks from animals, falls on rough roads or efforts to climb over rocks. Nearly all wounds of exposed surfaces take on an unhealthy action, and even scratches are hard to heal. Boils of a peculiar nature are also common, known under

the name of sores, for which a locality claims the honour as Delhi ulcer, Agra sore, and so on. In South Africa the term "Veldt sore" is common to all. Personally, wherever I have been on service I have seen this peculiar form of skin ulceration, and often have I heard a medical confrère say, "Why, this a Delhi boil," though the person afflicted may never have seen or heard of the city of Mutiny repute.

As can be understood, there is nothing to prevent contagious diseases of all varieties being prevalent in the dirty hovels (not worthy of the name of houses) which usually form the residential abodes of our savage opponents. On entering villages, young soldiers, and for the matter of that young officers, are often tempted to go looting in dens of this description, no doubt more from the novelty of the idea than anything else. The looter, as a rule, does not get much, probably some foodstuffs such as rice, old rags, or some wooden feeding mugs. In addition to the articles which he purloins, he often contracts a bad attack of small-pox or diphtheria. Let him convert his ill-gotten gains into a mess of pottage, and he becomes worse than Esau. He has sold for it more than his birthright, probably his life, if not the lives of others.

#### MEDICAL UNITS.

As regards medical units, the first essential is that every man should be prepared to work and help the cause in any way he can. No matter how well men have been trained, and no matter how they have specialized, for the time being they should be prepared to do anything. A cook with an Aldershot certificate of efficiency should not consider it an indignity to be asked to twist a mule's tail to make him move on. Neither should a soldier of the nursing section consider it derogatory to take a spade in his hand and dig, be it an entrenchment or a latrine.

In savage warfare it is hard to exceed one's duty, in the ordinary sense, so long as it is confined to honest labour in preference to advice or dictatorial orders to others as to how things should be done. In war one can learn a bit of every trade, and the more one knows the better. Though an officer or orderly may be a marksman in a bacteriological laboratory in peace, there is still more of a different nature to learn in war. The best motto for a medical unit to keep in it's mind's eye, is to be self-supporting and to be able to do everything for itself, without other assistance, from striking its matches to striking its own tents.

#### MEDICAL EQUIPMENT.

In savage warfare I think our surgical and medical panniers contain too much, and that there are also too many drawers and compartments. Personally, I would prefer articles that could not be affected by jolting, and that the boxes should give them more room to jolt in. It is one thing to pack a pannier while sitting comfortably in a store; it cannot be done so methodically at night time on open ground when shells are

bursting and mules are stampeding. My suggestion is to set free space in our panniers and carry the contents otherwise, a subject which I shall allude to when I produce for your inspection my idea for a field operating table.

#### FIRST FIELD DRESSINGS.

It is an important matter that fighting troops, and more particularly mounted troops likely to be detached, should be in possession of a first field dressing. At present they are carried in the left-hand flap of the service jacket, which from a sanitary point of view is a dangerous position, when men are obliged to micturate on the line of march at night time. From this cause I have seen dressings rendered quite unfit for the purpose for which they are intended.

On hot days men often take off their coats, particularly mounted men who strap them on their holsters. Therefore, under the condition stated, it has often occurred to my knowledge that the horse, the coat, and the first field dressing were left under cover, while the man went into action, without anything in the form of a dressing.

For mounted troops I would advise having the dressing carried in a little leather pouch, attached to and able to slip over the buckle of the bandolier. No extra ammunition space is required for it, it is not unsightly, and it could also be used as a pad for a rifle carried at the shoulder. Without asking for any extra space, I think it could also be attached to the new pattern canvas infantry belt. Associated with equipment and ammunition it would be more respected and better looked after than it is at present.

It would not be a bad idea in training men in the use of this dressing to teach them to put the covering either in one of their own pockets or in a pocket of the wounded man.

If positions, where these dressings have been used, have to be vacated, and the ground is strewn with their covers, they are likely to convey to the enemy an exaggerated idea of the injuries inflicted. Even savages know what an empty field dressing cover means. Should the officer commanding troops wish the other side to imagine that the casualties were larger than they really were, my suggestion would not hold water for a minute.

#### TRANSPORT.

When expeditions are being equipped at a base it is a sound idea for officers in charge of medical units to personally see transport animals before they are taken over. If he contents himself with sending a telegraphic or telephonic message for a hundred mules or so, it is wonderful what strange beasts are likely to be detailed to meet his requirements, and it is all that he should expect.

It is a wise thing for officers commanding field ambulances to make a point of seeing that all equipment and ambulance animals are kept as

first line transport under their own supervision. The kit and ration beasts are of course directly under the brigade transport officer. This officer often thinks it advisable to keep all transport under him, and to work on peace lines, which is a system that is likely to lead to friction, as it may mean that the official may expect an indent for a wagon required to remove a wounded soldier. By all means lend wagons to the transport officer if they are not required (be always obliging), but have the question as to who is the owner settled before you start.

I do not propose to enter into the question of veterinary surgery, but it is a sound principle for young officers of the corps to learn a little about animals. I mean, of course, such a simple thing as to know which end of a mule kicks. Also to be aware of the fact that shoulder galls are best seen with the blanket or saddle off, likewise that mules that will not (or cannot) stand up when they are being harnessed are not likely to give satisfaction.

#### INVENTIONS.

No. 1. *The Valeda Stretcher*.—This stretcher I first came across in Alexandria, where it was used by the fire brigade, giving entire satisfaction.

The stretcher is a German invention. In its closed up form it is a neat and compact packet which can be carried on the back or in the hand, if so desired. Its measurements are  $12 \times 15 \times 6$  inches, and its weight is 26 lb. complete with cover, which forms the support when the stretcher is in use.

It is constructed on the X bed system and made of light steel covered with a non-corrodible solution. One of the great advantages is the simplicity of construction and the fact that the legs, handles, and head support come into position when the stretcher is opened without any further action on the part of the bearers.

In fig. 1 the stretcher is shown opened up before the canvas has been attached. It is exceedingly strong and it will bear weight even without the support.

Fig. 2 shows the stretcher in use.

As far as my opinion goes this form of ambulance conveyance has many advantages over the present one.

It occupies much less space when packed. It can be carried on the back of a mule or horse; it is provided with a head support and can be used as a bed. The cover is fixed, and the stretcher can be attached to the back of the bearer by hooks instead of buckles. It can be worked by two men, and got ready in an exceedingly short time. The slings (self adjusting) can be altered even while a patient is being carried; there is nothing to be lost, as to pack it up all its few parts are required.

It has one drawback. The initial expense must be greater than that of the stretcher we use at present, but I consider that for hill warfare

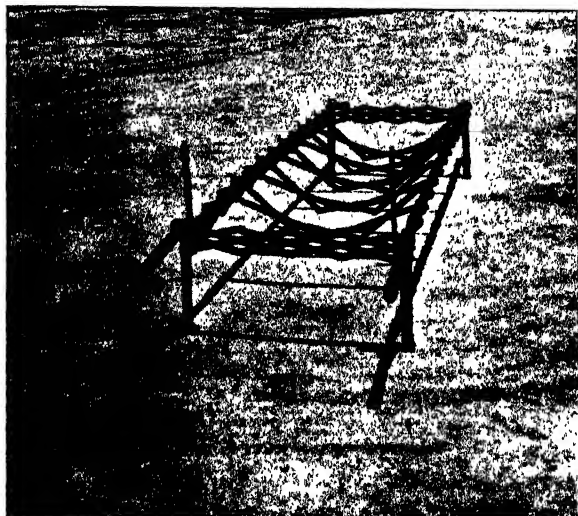


FIG. 1.



FIG. 2.

or for use with mounted troops this outlay would be compensated for by its many advantages. It is also provided with a hood for use in tropical or wet countries.

P.S.—As the result of remarks made in the discussion after the lecture by Colonel Hathaway, and other officers, I am now working out a scheme for attaching the stretcher to a saddle, and also for connecting it to two bicycles with the idea of forming a wheeled stretcher. So far I have got the principle, but the exact details are not sufficiently advanced to allow me to make a trial of its powers.



FIG. 3.—Table folded ready for packing on mule or cart.

*Invention No. 2. A Field Operating Table.*—As I have previously stated, I consider our panniers too much made up of nooks and crannies; therefore, my suggestion would be to set free more space and carry elsewhere the capital case. With that idea, I invented, and I may say made (with the assistance of my brother) the table shown in figs. 3 and 4. From the illustrations you can judge what it is like, and it only remains for me to give some further details.

I claim for it the following advantages as a field operating table:—

(1) It is simple in construction, cannot get out of order, and can be taken to bits and put together in half a minute.

(2) It will stand any amount of knocking about, and it would not be injured even if a wagon rolled over it.

(3) Its weight with all equipment is 70 lb. (half a mule load) ; without equipment the weight is 40 lb.

(4) The following articles of equipment which are usually wanted in conjunction with an operating table are carried in the table itself, therefore some delay is saved. The present pattern operating case, a steriliser with lamp, waterproof sheet, chloroform, tin of spirit, also some compressed wool and bandages.

(5) There are no crevices to hold dirt, it can be washed with ease, and if necessary be put right into a Thresh disinfecter.

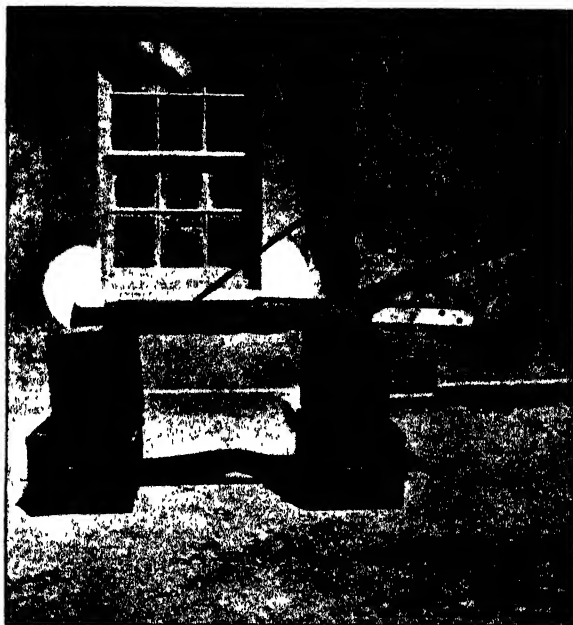


FIG. 4.—Showing elevation and storage drawers for medical equipment.

(6) It can be used as a stretcher as well as a table.

The following faults have been brought to my notice :—

(1) It has no legs, therefore it is unsuitable as a portable operating table.

My answer is : That it is not intended for the use of a general practitioner who might walk all over the five Continents under war conditions without finding ground level enough for a table with legs, but panniers or other boxes, like the poor, he will always have with him. If in a

standing camp legs are required, the ordinary trestle legs of a barrack table answer the purpose.

Another expert told me that as it was not provided with a glass top there was danger that it might not be absolutely sterile. He was a free trader, he was. In his own log cabin, I mean his marble operating room, he had a glass operating table, and once having adopted glass he could not tolerate the idea of returning to wood. All I could say was, that glass may be broken as the result of vibration from beating the big drum, or cheers of victory, without mentioning such details as concussions, projectiles, or mules' hind shoes.

As regards comparisons between this and the present form of field operating table, I am unable to speak, as I do not know what the latter is like, but when this table was invented no table was provided at all.

As regards comparisons with tables used in civilisation, I have only two points to bring forward in its favour: the first is that it cost me 16s. to make; and secondly, that it can be fore-shortened for operations about the rectum, enabling the anæsthetist to get near his patient.

I shall now bring my lecture to a termination, and I can assure you that I apologize for having occupied so much of your valuable time. In conclusion, I can only mention that the substance of my lecture has been taken from personal experiences, and that my opinions and suggestions are not intended to be dogmatic. My motto is: That every one in a profession like ours is entitled to his own opinion, but though he may exist on it, he should serve it only as requested. He should desist when others have had *quantum suf.*, which was once translated by a candidate in the examination for dispenser as "shake the bottle before use."

## Reviews.

How to CUT THE DRUG BILL. By A. H. Hart, M.D. London: John Bale, Sons and Danielsson, Ltd., 1910. Second Edition. Pp. xiii. + 57. Price 2s. 6d. net.

This book will be found to be of much value to the practitioner who compounds his own medicines. A great feature of the book is the adoption of the systematic use of abbreviations in prescription writing. In addition, it is an attempt on the part of the writer to enable medical men in practice, who work according to the methods advocated in the book, to reduce their drug bill 20 or possibly 50 per cent. How this can be done is fully explained in the text. The book will undoubtedly be found a useful one to medical officers. From it one can readily substitute preparations compounded in the dispensary for the more elaborate and expensive preparations of the Pharmacopœia. In addition there is a useful detachable table printed on cardboard, showing the abbreviations used

and their corresponding mixtures. The book is clearly printed and of a convenient size.

The majority of the numerous prescriptions given are well known as useful combinations, and the quantities are given so as to enable the formulæ for mixtures to be made up to  $\mathfrak{z}$ i. or Oii. as required.

The publication is a very practical one, and will be found to be of great use in the larger military hospitals, where many stock mixtures, &c., are in use.

F. M. M.

THE A.B.C. OF THE ARMY. By Captain J. Atkinson. London: Gale and Polden, Ltd. Pp. x + 112. Price 1s. net.

"An illustrated guide to military knowledge for those who seek a general acquaintance with elementary matters pertaining to the British Army."

This book may be recommended to those about to embark on a military career in any capacity, or to civilians desiring to acquire a general and somewhat superficial knowledge of the Army. The illustrations of the various badges of rank, &c., are particularly useful, but it is to be regretted that the badges of rank of officers' field service dress were not included. Small sketches illustrating the various ways in which a soldier may salute his superiors would have been a useful addition, this being a frequent stumbling-block to beginners. The expression "medical surgeons" is quaint and might with advantage be replaced by the usual term "medical officers." In spite of sundry minor inaccuracies, and considering the difficulty in selecting the material most suited to such a work, the author is on the whole to be congratulated on the result.

G. G. D.

MEDICAL VADE-MECUM IN GERMAN AND ENGLISH. By B. Lewis. With Preface by Professor Dr. A. Politzer. London: J. and A. Churchill. 1910. Pp. 559. 9 in. by 5½ in. Price 15s.

This excellent work should prove of the greatest assistance to any English medical man wishing to obtain a knowledge of German medical terms or *vice versa*. With even a fair working knowledge of a foreign language it is extremely difficult to grasp all the technical terms employed in medical literature. This book has been so arranged that the German on the one page corresponds closely with the English on the opposite, consequently there is no need for wearisome references to a dictionary.

The first half of the book contains twenty-five lectures on a variety of medical subjects delivered by the Professors and tutors of the University of Vienna. The list comprises such well-known names as that of Professor Lorenz, who contributes a chapter on Tuberculous Affections of the Joints in Children, and Professor Zuckerkandl, who describes an operation for renal calculus, so that quite apart from the question of learning German, the medical man can improve his professional knowledge.

In the next section the histories of some thirty fairly representative diseases are dealt with. The medical man's questions and patient's answers, as also the diagnoses formed, are given in German and English.

The third section describes very fully the chemical and microscopical examination of blood, sputum, &c., by the most recent methods, and is well worth reading in English alone.

The work can be strongly recommended to any one who wishes to

make acquaintance with or improve his knowledge of German medical literature. Any medical man who intends to study at a German clinic should make a point of reading this book before starting, as he should then have no difficulty in following the clinical teaching which forms such an important feature in the German curricula.

C. E. P.

ELECTRICAL RECORDING THERMOMETERS FOR CLINICAL WORK, by H. L. Callendar (*Proceedings of the Physical Society of London*, vol. xxii). This pamphlet describes a number of forms of electrical thermometers designed for obtaining a continuous record of the body temperature. The thermometers vary in construction according as they are to be used in the axilla, mouth, or rectum. That for the mouth consists of a fine platinum wire wound on to a flat plate of mica with compensated leads. The apparatus is fitted into a containing tube of lead glass, the lower end of which is fused to the wire so as to form a flat bulb. For the rectum the wire forming the bulb is wound on to a thin celluloid tube 5 mm. in diameter, and is protected by another thin celluloid tube which accurately fits the first: the rectal end of the protecting tube is closed with a small celluloid stopper and the external end is cemented on to the cut end of a Porges catheter, 5 mm. in external diameter and 32 cm. long, through which the flexible thermometer and compensator leads are passed. In the axillary thermometer the wire is wound on to a thin strip of photographic celluloid film, and the bulb thus formed is inserted into an envelope of thin celluloid; the flexible leads are flattened and insulated between celluloid films at the point where they join the thermometer coil. The thermometer is fixed in position by a cotton-wool pad and an elastic band over the opposite shoulder, or, better, it is cemented down to the skin by means of adhesive wax. The records are taken either by the deflexion method with a thread recorder, or by the balance method with a slide wire recorder. Several of the records given are of interest from a medical point of view. When the mouth temperature was taken it was found that if the mouth had been kept closed for ten minutes before inserting the thermometer the record reached within a third of a degree Centigrade of its final point in one minute after insertion; when the mouth had only been closed for three minutes the thermometer did not register within a quarter of a degree of its final record until more than ten minutes after insertion, and if the mouth had not previously been kept closed the temperature record did not even reach 32° C. till after more than one minute, and it was still 1° C. below the real temperature seven minutes after insertion. This occurred with a thermometer the "lag" of which was so small that when placed in a water-bath at 37° C. it could not be recorded satisfactorily. In another record, taken in the rectum, it was found that on a hot night the temperature rose  $\frac{1}{2}$ ° C., while in the same subject (a normal man) the influence of external cold was shown by a fall of nearly  $\frac{3}{4}$ ° C.; on this occasion the subject woke appreciably chilled. The apparatus adds another weapon to our armamentarium for clinical and physiological research work, and one can imagine that it may turn out to be useful for diagnostic purposes also; for example, in some cases of malignant malarial infections.

W. S. H.

**REMEDIA HOECHST:** Pharmaceutical Products, Therapeutic Sera and Bacterial Preparations manufactured by Meister, Lucius and Brüning. (No publisher or price is given.)

Although this work of some 800 pages is really issued as a catalogue of the preparations manufactured by this firm, still the book contains a great deal of scientific information relating to the manufacture, testing and standardising of products, and it may well prove of considerable interest as a work of reference, especially to those who are concerned with skin and venereal diseases, local anæsthesia and therapeutic sera or bacterial vaccinations. Each article is described on a definite plan somewhat similar to that followed in the British Pharmacopœia. Thus there is a short history of its introduction, followed by the method of preparation; next its chemical and physical properties are described, then its reactions and tests, after which come the pharmacology, indications for use and the dosage. A variety of prescriptions are given, and finally a very complete bibliography with numerous reprints from the leading medical journals of all articles contributed by eminent medical men, on the use of and results obtained with the particular drug. In the case of albargin, this literature occupies 27 pages. The therapeutic sera and bacterial vaccines are equally fully treated and really furnish a mass of useful information on the employment of these remedies.

The work is a monument of industry and may be recommended as a useful work of reference.

C. E. P

**ATLAS OF PATHOLOGICAL ANATOMY.** By the late Professor Alfred Kast, Breslau; Professor Eugen Fraenkel and Dr. Theodor Rumpel, Hamburg. Published by Werner Klinkhardt, Leipzig. London: Baillière, Tindall and Cox. Complete in 26 parts. Price 5s. each, net.

The first instalment of twelve parts of this atlas of pathological anatomy impresses one strongly with the great advances which have been made in modern methods of colour reproduction, for the plates, without exception, leave nothing to be desired in accuracy of line and fidelity of colouring. They purport to be faithful reproductions of pathological material, fresh from the *post-mortem* room, and they reflect the highest credit both on the artists and on the printers. The present instalment consists of twelve parts, each containing four to six loose coloured plates of large size, and each part is accompanied by a polyglot descriptive sheet giving a concise account of the history of the case and the character of the lesion. The tongues employed are English, Russian, German, and Italian, and the rather noticeable exception of French is explained in an editorial note which foreshadows a separate French edition.

The scheme of the work shows that all the chief systems of the body are to have representative plates, but the subjects chosen for illustration hardly appear likely to be of equal value to the pathologist; comment on this, however, is premature and would perhaps be unjust as the larger portion of the series has still to come. At the same time, one is struck by the number of plates devoted to the illustration of such subjects as the condition of the stomach after poisoning by a corrosive acid and the condition of the intestine in Asiatic cholera, both most interesting subjects; but it is evident that the space devoted to them must be, to some extent, at the expense of other subjects of more general interest.

In a few instances coloured reproductions of microscopical sections of the lesions, whose gross features are so beautifully depicted, are appended to the particular plate. It cannot be said that these are of the same value since the magnification employed is so small that the characteristic features of the lesion are not readily distinguishable. A reproduction of cholera vibrios, on a similarly small scale, also appears superfluous and not a little likely to be misleading.

W. B. L.

## Current Literature.

**Army Medical Service, France.**—**TRAINING.** : *Courses of instruction for officers of the regular and auxiliary forces army medical service to prepare them for their duties on mobilisation.*

A new scheme of training in place of that issued on February 10th, 1909, has just been officially published by the " Direction du Service de Santé ; Bureau des Personnels." *Bulletin du Ministère de la Guerre*, December, 1909.

### 1.—General Organisation.

Each year a course of instruction will be held for the medical officers, pharmacists, and quartermasters of the reserve and territorial army who, in case of mobilisation, are allotted to field medical units. This course shall consist of

- (1) Lectures and demonstrations.
- (2) Practical exercises.

The course will be held in the six centres : Paris, Rennes, Limoges, Montauban, Lyons, Chalons, and will consist of two parts. The first part will be for officers of the reserve who on mobilisation are detailed for field ambulances and field hospitals. These officers must attend for twenty days, beginning on the first Monday in June.

The second part is for army medical officers of the " territorial army " (medical officers, pharmacists, and quartermasters), also for pharmacists of the reserve, who on mobilisation are detailed to field hospitals, clearing hospitals, hospital trains, and to the reserve *personnel*. These officers will have to attend for ten days beginning on the second Thursday in June.

The course of instruction is placed under the authority of the general officer commanding the army corps of the district.

The instruction as regards military operations will be directed by a general officer belonging to the army corps of the district ; the military medical portion will be directed by one of the *médecins-principaux* (colonels) of the army corps.

The preparation and organisation of the course will be left entirely to the principal medical officer of the army corps who will make arrangements with the *médecin-principal* appointed technical director.

(1) *Lectures.*—A certain number of lectures must be attended by all officers ; these will be essentially practical and will deal with circumstances which it is necessary for every medical officer employed at the front to

be acquainted with. Following these there will be special lectures and demonstrations for officers of different medical units. The lectures will be delivered by officers on the active list belonging to the garrison. Purely military lectures will be given by a general staff officer.

(2) *Practical Exercises*.—After the lectures there will be practical exercises carried out by army medical units, following which there will be garrison army medical manœuvres. The latter will be arranged so that each of the medical units will be tested in its particular work (dressing stations, ambulances, field hospitals, clearing hospitals).

## II.—*Officers, troops, and army medical personnel taking part in the course of instruction.*

(1) The general officer commanding the army corps will appoint a general officer to direct the exercises of the medical units and military operations. He will arrange for the required transport; if necessary, he may take drivers, vehicles, and mules from the artillery or cavalry.

(2) *Army Medical Personnel*.—The army medical personnel on the active list required to conduct the course of instruction will consist of one *médecin-principal*, first class (colonel), and one *médecin-principal*, second class (lieutenant-colonel), who will be appointed by the Minister of War (follows a table of personnel for field units).

These officers will be provided by the army corps of the districts in which the course is held; as far as possible, officers will be selected for the duty which on mobilisation they will have to perform.

The regimental medical service will be furnished by medical officers doing duty with the troops. The medical officers, pharmacists, and quartermasters of the reserve and territorial army will be nominated by the principal medical officers of the army corps to which they are attached, and will be sent to the nearest camp of instruction. Officers of the auxiliary medical service called up for the course of instruction will be allotted to each of the medical units as far as funds permit, in a definite proportion to the total personnel called up.

The orderlies for units and stretcher bearers will be provided partly from those of the regular army and partly from the reserve who can be called out without inconvenience at the times selected.

## III.—*The Course at a School of Instruction.*

Officers of the reserve and territorial army will be informed annually by means of the local press of the date of commencement of the courses. Any officers wishing to attend a course will apply to the principal medical officer of the army corps one month beforehand.

## IV.—*Reports.*

At the termination of the course, officers belonging to the regular army will be reported on by the technical director. The reserve officers who are detailed to attend will be similarly reported on. The special aptitude of officers attending voluntarily will be noted in the report. All these reports will be forwarded to the principal medical officer of the army corps to which the officer belongs.

## V.—*Matériel and Animals for the Exercises.*

The *matériel* as laid down for army medical services will be employed for: (a) Poste de secours; (b) one infantry divisional ambulance; (c) one section of a corps ambulance; (d) one field hospital; (e) one clearing hospital and a portion of a hospital train.

# VI.—*Lectures and Practical Demonstrations.*

These will be arranged by the *médecin principal* appointed technical director according to the following programme :—

## *First Part.*

(1) Lectures for all officers. Mobilisation, the meaning of, orders on, place of, measures to be taken by army medical officers when mobilisation is ordered. Map reading on the ground. Constitution of an army, fighting tactics. Functions of the army medical service in the field. Food supplies in the field, use of requisitions. Deaths, formalities to be carried out; burials. Clearing and sanitation of the battlefield.

In addition, quartermasters will have lectures on accounting, civil law, &c.

(2) Special lectures and demonstrations for the *personnel* detailed for field ambulances.

Demonstration of the *matériel* of a field ambulance Mark A. Mobilisation of a field ambulance. Cantonment and bivouac of a field ambulance. Work of a field ambulance when stationary, on the march, during and after a battle. Packing up and replenishing stores. Steps to be taken when in danger of being captured—(duties and rights of the *personnel*).

(3) Special lectures and demonstrations for the *personnel* of field hospitals, composition and *personnel* mobilisation, camp of, functions at the front and when immobilised on lines of communication.

Evacuating the hospital: Duties and rights in the event of capture.

## *Second Part.*

(1) Lectures for all officers.

(2) Clearing hospital *matériel* and *personnel*. Mobilisation and work of a field hospital.

(3) Special lectures for *personnel* detailed to clearing hospitals, trains, and reserve *personnel*.

Demonstration of *matériel* of a clearing hospital.

Mobilisation and functions of a clearing hospital.

A general study of evacuation; convoys by road; rest stations; convoys by water; hospital trains.

(B.) *Practical Exercises.*—The programme will be drawn up by the general officer commanding and principal medical officer, and submitted to the Minister of War (7th Direction) one month before the commencement.

The technical director will in issuing orders endeavour to leave as much as possible to the initiative of the senior medical officers of corps and medical units.

The technical director and senior medical officers will keep diaries of marches and operations, as well as the official returns laid down in regulations.

The admission, treatment, and evacuation of wounded will be carried out as prescribed by regulations.

VII.—Deals with allowances to those taking part in the training.

VIII.—How expenses are to be charged.

IX.—At the termination of the course the technical director will furnish a report.

Surgical material which is still serviceable will be handed over to the

troops and hospitals of the district for use. Material which has been rendered unfit for further service will be replaced from medical stores with as little delay as possible, or, if this cannot be done, indents will be sent to the War Office.

C. E. P.

**The New German "S" Ammunition.**—Professor Fessler has published the results of experiments with the new German "S" ammunition on human and animal bodies at ranges varying from 10 to 1,500 metres at the Bavarian School of Musketry. (*Die Wirkung der modernen Spitzgeschosse.*)

A series of twenty-three experiments were made; 26,100 rounds were fired and 700 hits obtained, the results of which are minutely detailed in the work.

*General Conclusions.*—(1) The bullet hardly ever breaks up (one point missing in 87 examined); it cannot, therefore, be classed as explosive; on striking a hard bone the point may be bent.

(2) The centre of gravity of the bullet lies in the posterior third; hence, after meeting with any resisting object it almost always turns round a vertical, oblique, or horizontal axis running through its centre of gravity, and, apparently, nearly always strikes the second object broadside on. The nearer the range the less resistance is required to initiate this movement, and the shorter the distance required to permit of a complete change in its position.

(3) The first wound made by a bullet always has a greyish-black margin; this discoloration is due to partially consumed cellulose; it may be carried into the tissues for a depth of 1 in. or more, but is never found in a second wound made by the same bullet, or if the wound has been caused by a ricochet.

(4) The kind of wound produced depends mainly on the position of the bullet when it strikes the object, and to a lesser degree on the range, *i.e.*, its velocity at the time. Explosive effects occur up to 700 metres, but no definite zones can be assigned.

(5) *Striking Point on.*—In soft tissues the wound of entry is small, the track larger than the calibre of the bullet, the walls are raw and lacerated (*gehackt*). Hard and long bones are perforated with the formation of a number of radial fissures and splinters. At close ranges minute splinters predominate. Soft organs (liver and spleen) are ploughed up. Vessels and nerves are destroyed—wounds of entry in the stomach and bowel are small, wounds of exit are larger and permit of escape of contents.

(6) *Striking Broadside on.*—Very slight resistance, *e.g.*, the chest wall, a knapsack, or even at near ranges (up to 50 metres) the abdominal wall, is sufficient to induce this change of position. In the soft tissues the track is very much larger than the calibre, and the walls pulped. The wound of exit is large. Wounds of stomach and bowel are large and allow the escape of contents. Soft organs, liver and spleen, are torn up and pulped. When a bullet in the vertical or cross position (*querschläger*) strikes a long bone (up to ranges of 700 metres) it pulverizes the bone, driving splinters and bone *débris* into the soft tissues and forms a cavity (*trümmer-höhle*) filled with pulped tissues as large as a goose's egg. At 1,500 metres a "*querschläger*" smashes the bone, producing large fragments, but with less pulping of the tissues than at near ranges; the bullet may remain embedded in the body.

(7) *At 400-metres Range.*—Compared with the M. 88 or Mannlicher bullet, the "S" bullet produces a smaller track in muscles, but the walls are more damaged (bruised and lacerated). The area of explosive damage in bones is not greater, but the bone is much more pulverized and the pulped cavity beyond the bone is greater, *i.e.*, the zone of destruction extends to a greater depth. At 700 metres the bone destruction is as great as at 400 metres.

(8) The medical lessons to be learnt from these experiments are: For first aid and at dressing stations we must expect and provide for:—

(i.) Very large first field dressings in order to cover the wounds of exit after a vertical or cross bullet wound.

(ii.) An increased supply of means for arresting hæmorrhage.

(iii.) An increased supply of splints; the damage inflicted on bones by a cross bullet is so extensive that very careful splinting will be required before removing the man.

(iv.) An increase in the number of amputations.

(v.) Many cases of severe internal hæmorrhage.

(vi.) Escape of stomach and bowel contents in all abdominal wounds.

C. E. P.

**On the Treatment of Fractures of the Metatarsal Bones by means of the "Klebrobinde,"** by Stabsarzt Krumbein, *Deutsch Militär. Zeitsch.*, April 20, 1910.—The writer treated fifty-one cases; in twenty-two the second metatarsal was fractured, and in sixteen the third. The bandage is an elastic crape one, impregnated with an adhesive substance. When firmly applied to the foot it forms a close-fitting support, and at the same time possesses sufficient elasticity to permit of walking.

Krumbein recommends the following routine:—

(1) An examination by "X" rays in order to confirm the diagnosis.

(2) Apply the "Klebrobinde" as directed by v. Heuss, and allow the patient to rest in bed for a few hours. He is then to get up and begin graduated walking exercises, wearing laced shoes, and be excused all duty.

(3) To attend daily at the out-patient room for inspection for four to five days, and then to be ordered light duty for a week. At the end of three weeks, from the date of the fracture, the bandage should be removed and the foot again examined by "X" rays. The results were most satisfactory.

C. E. P.

**Hearing and Military Service—a Comparison of the Army Medical Regulations of Different Countries,** by Oberstabsarzt Dr. Blau, *Deutsch Militär. Zeitsch.*, April 20, 1910.—Blau has studied the army medical regulations dealing with hearing and diseases of the ear of ten different countries.

*Examination of Recruits.*—England merely requires that the recruit's hearing shall be good. The French instructions direct that the external ear is to be examined, and the range of hearing to be entered according to the distance at which a whisper can be heard; the acuteness of hearing is to be shown by the distance at which the ticking of a watch ceases to be heard. Italy does not lay down any minimum standard of hearing.

The following countries use the whispered voice as the standard test of hearing. The distances given are the minimum at which whispered words must be heard:—

*Holland.*—The Dutch regulations define normal hearing as capability of hearing whispered words at a minimum distance of 20 feet. The standards for the Regular army demand normal hearing in one ear and capacity to hear whispered words at a minimum distance of 5 feet with the other. For the Militia and Reserves a hearing range of 20 inches with one ear and 10 feet with the other, or 5 feet with each ear is accepted. If the hearing of either ear falls below 20 inches the recruit is considered unfit.

*Austria.*—The external meatus, tympanum and surface of the mastoid process are to be examined; should it be considered necessary, the recruit may be sent to a military hospital for detailed examination.

The recruit is to be tested by being made to repeat whispered words; the intensity of the whisper should be such that a person with normal hearing could just distinguish the words at a distance of  $6\frac{1}{2}$  ft. in the open on a quiet day; in a closed room this distance would be 73 ft. The recruit is to be placed looking at right angles to the examiner so as to present the ear which is to be examined, and also to prevent any attempt at lip reading.

Recruits are classified:—

(a) Fit for general service. Range of hearing with both ears not less than 13 ft. Range of hearing one ear  $6\frac{1}{2}$  ft., and the other 20 ft.

(b) Not fully fit, but fit to serve. Both ears not less than  $6\frac{1}{2}$  ft. One ear less than  $6\frac{1}{2}$  ft., the other 20 ft.

(c) Unfit to serve with armed troops. Hearing less than  $6\frac{1}{2}$  ft. in both ears.

(d) Unfit to serve in any capacity. Complete deafness in both ears.

*Russia.*—If unable to hear whispered words at 9 ft. he will be considered unfit. In cases of doubt the recruit will be sent to a military hospital for examination.

*Sweden.*—Must be able to hear a moderately loud whisper at 17 ft.

*Switzerland.*—Deficient hearing is defined as inability to hear distinctly whispered words at 3 ft. 4 in. distance, deficient hearing in one ear only does not excuse a man from serving.

*Germany.*—The recruit's hearing is to be tested first by conversation carried on in a low voice; when deficient hearing is suspected reports from his school and doctor are to be called for. To allow for the varying acoustic properties of different rooms the examining medical officer will then mark off the distance at which a person of normal hearing can hear words whispered by him. Numerals from 21 to 99 chosen at random are to be used in testing the hearing.

Results are classified as follows:—

(a) Fit for all service. Deficient hearing in one ear only, *i.e.*, the range of hearing is between 13 and  $3\frac{1}{2}$  ft.

(b) Unfit for service with armed troops; fit for reserve or service with unarmed troops; in the case of a trained soldier unfit for field service; deficient hearing in both ears, or extreme deficiency in one ear, the other being normal.

Blau points out that no one has succeeded in defining "normal hearing," but that in practice a soldier to be considered quite fit for service should be able to hear a whisper at a distance of  $6\frac{1}{2}$  to 20 ft.

Blau then refers to the standardization of hearing proposed at the International Congress of Otologists at Buda Pesth in 1909.

Blau next proceeds to compare the appliances and accommodation considered necessary for the examination of recruits' hearing as laid down in the regulations for various countries.

In this section Blau quotes the various regulations dealing with diseases of the ears which may be considered to render a man unfit to serve. England merely mentions defects of hearing. France deals most minutely with every condition which may affect the ears or allied cavities. All the countries give a more or less detailed list of diseases which render a man unfit to serve. A simple dry perforation of the membrane is in most countries not considered a bar to service.

For the guidance of invaliding boards German regulations classify the degree of interference which the disability may exercise on the man's capacity for earning a livelihood in civil life. C. E. P.

### **The Prophylaxis of Cerebro-spinal Meningitis in the French Army.**

—(Direction du Service de Santé : Bureau du matériel, Hygiène, No. 16, Paris, April 9th, 1910). This circular cancels the one dated February 18th, 1909, dealing with the same subject.

(1) Every definite or suspected case of cerebro-spinal meningitis is to be reported by telegram to the War Office and brought to the notice of general officer commanding. The diagnosis will be confirmed by bacteriological examination of the cerebro-spinal fluid; it is to be remembered that this fluid may remain clear throughout an attack, and that the meningococcus is not always present. The precipitation reaction must not be omitted.

(2) The precautions enumerated below will be taken without waiting for the result of the bacteriological examination.

(a) *Isolation of Contacts*.—All men occupying the room in which the case occurred, as well as the patient's friends, will be isolated. A room in barracks, if available, may be used for this purpose; separate dining rooms, lavatories and latrines must be assigned for their use. If no suitable room is available in barracks the general officer commanding must arrange with the civil authorities to take over some building, due regard being had to the public safety.

All handkerchiefs and underclothing will be disinfected in boiling water before being sent to the wash. The isolation is not to take the form of confinement to a room; drills and exercises are to be arranged for under the superintendence of a non-commissioned officer, who will see that these men do not mix with other soldiers or civilians. This isolation is merely a precautionary measure to be enforced till the results of the bacteriological examination of the nares and fauces has been obtained. Men found to be free from the germs will be allowed to rejoin their units at once; carriers will be dealt with as follows:—

(b) *Carriers*.—All carriers are sources of infection and will, if possible, be isolated in hospital or in some other suitable place. The rooms will be suitably warmed in winter. No distinction will be made between N.C.O's. and privates. N.C.O's. living in the town will not be isolated in hospital, but they will not be permitted to do any duty with the troops until free of infection, and they will be warned of the risk of infection to other people living in the same house.

Carriers will have the mouth and pharynx disinfected at regular

intervals as described below ; they will be kept isolated until two successive bacteriological examinations at some days interval show that they are free from infection. On the day of the examination the nose will not be disinfected until after the culture has been taken.

Handkerchiefs and linen belonging to carriers will be boiled before being sent to the wash ; the bedding occupied before and during isolation, as also their clothes, will be disinfected in accordance with para. 7, A.M.S. regulations. Carriers will be permitted to take exercise in a part of the grounds reserved for them, and may leave hospital if under the charge of a N.C.O., who will be responsible that they do not mix with civilians or other soldiers.

(c) *Patients*.—Patients suffering from cerebro-spinal meningitis will be placed in a special ward. They will be treated with anti-meningococcal serum, according to the direction sent with each bottle of serum. Relapses may occur after the serum treatment ; convalescents should therefore be carefully watched to detect the earliest sign of this. Patients who have recovered will not be allowed out until the bacteriological examination has shown them to be free from infection.

(d) *General Observations*.—Fatigue, chill, cold and damp are powerful predisposing agents of this disease : on the occurrence of a case, therefore, every endeavour will be made to protect the troops as far as possible. Any men suffering from coryza should be tested bacteriologically and treated as suspects ; similarly, any man complaining of headache or vomiting should be subjected to the same treatment.

(3) *Calling out of Reserves*.—When any case has occurred in the garrison no reservists will be called out till a period of two months has passed since the last case occurred. In a large garrison with several regiments, reservists belonging to a regiment which has remained free of the disease may be called out, provided that the regiment occupies a separate barracks.

*Instructions for the Disinfection of the Naso-pharynx and Mouth*.—All carriers must have the naso-pharynx, mouth, and tonsils carefully disinfected by antiseptic inhalations and swabbing.

*Inhalation*.—The following mixture is recommended :—

Iodine .. .. .	12 grammes.
Guaiacol .. .. .	2     "
Thymol .. .. .	25 centigrammes.
Alcohol, 60 per cent. .. .. .	200 grammes.

NOTE.—In order to dissolve the iodine 6 grammes of iodide of potash should be added to the above.

This mixture is put in a porcelain dish, which is floated in a basin of boiling water. The patient is directed to sit with his head bent over this at a few inches distance and inhale the fumes, breathing slowly through each nostril ; the sitting should last for two or three minutes and should be repeated five times in twenty-four hours.

*Disinfection of the Pharynx*.—This should be carried out by swabbing with glycerine containing 3 per cent. of iodine ; the swabbing is to be done most carefully morning and evening.

*Disinfection of the Mouth*.—The gargle recommended is 20 parts of peroxide of hydrogen (10 vols.), distilled water 180 parts, the mixture being supplied in a separate corked bottle to each man. C. E. P.

**Études sur le Service de Santé en Campagne.** Dr Follenfant, *Journ. des Sciences Militaires*, April 1st, 1910 *The Provision of Hospital Accommodation after a Battle*—As a result of his experience in Manchuria, Follenfant says that the medical services should be prepared to accommodate in hospital, at or near the field of battle, one quarter of the total number of wounded. About half of this number would be very serious cases unfit for transport, and the other half would consist of less seriously wounded men and some sick whom it would not be possible to remove to the rear at once. The proportion stated (one quarter) should be ample, as the actual number so treated after the battles of Sandepou and Mukden was nearer an eighth, and in future battles it is not likely that the losses will be greater than after the battle of Mukden, in which the number of Russian wounded was more than a sixth, and the Japanese more than a fifth of the entire forces engaged. Taking a European army of 100,000 men, some kind of hospital accommodation in or near the battlefield for 5,000 at most would be required, and the medical units should be prepared to find this during the two or three days of battle.

Dr. Follenfant then proceeds to show how all the medical units in war really form a single service, each unit from front to base being dependent on the next like the links of a chain. He says that within three hours from the beginning of a battle the slightly wounded will have reached places five to six miles in rear of the fighting line, while at the same time convoys of severely wounded will be moving towards the rear. Hence it is necessary that all the different units should be in position and ready to commence work at the same time. The evacuation hospitals and extemporised hospitals should commence their work at the earliest moment, for if any time be lost the whole service from front to rear will be over-burdened and become blocked.

If the battle takes the form of an attack by the enemy on an army in the line of march, the arrangements for improvising a hospital must necessarily be of a rough-and-ready nature. Follenfant points out, however, that most of the battles of the future will be planned battles, taking place in selected situations, and lasting for several days. It is under these circumstances that improvised hospitals will have their greatest value. The site selected for the extemporised hospital must depend on several factors, thus: if the field ambulances are well provided with means of transport for wounded there is no objection to selecting a site some miles in rear of the fighting line, and this has the advantage of allowing a greater choice of localities and buildings, which are also less likely to have been used for housing the troops or to have suffered damage from projectiles. Follenfant points out that modern surgery cannot be carried out in any dirty hovel with an entire absence of appliances and scanty supply of water, under these circumstances a hospital cannot be improvised, surgical operations had much better not be attempted, and all that can be done is to arrange for some kind of temporary shelter for the wounded.

Follenfant suggests that when the general staffs of various armies are making strategic plans for different campaigns, a medical officer should be told off to select the most suitable buildings for hospitals, and these should be noted in the general staff plans, and reserved for this purpose only.

He advises the appropriation of school buildings for hospital purposes as being in every way more suitable than private houses, and thinks that 250 beds for each division should be ample to accommodate all the wounded unfit for further transport. If any large town is near it would be advantageous to place all the most serious cases there, as in a large town it is easier to obtain the necessary supplies and articles of equipment. In winter time stretchers cannot be used in place of bedsteads, unless a thick layer of straw is spread under them, as if placed on the ground or even a tiled floor the patient soon begins to suffer from cold, and becomes thoroughly chilled.

During the Manchurian campaign each senior medical officer in charge of a Russian hospital was allowed about £240 in cash to pay for local purchases, receipts for payments made being the only formality necessary to obtain more funds.

Follenfant emphasises the importance of warming the rooms used as hospital wards in winter time; this also has the advantage of reducing the quantity of bedding and bed-clothes required for each patient. Judging by his experience in Manchuria Follenfant says that ventilation is of secondary importance compared to the warming of the wards and goes so far as to say that the absence of ventilation never did any harm. He states that the barracks built for the troops guarding the railway line in Manchuria made excellent hospitals and that the rooms were frequently occupied by twice as many patients as the number of healthy troops for whom they were designed; most of these patients had suppurating wounds and yet on entering one of these rooms no disagreeable smell was noticeable and the wounds all healed up rapidly. These barracks were single story buildings about 42 feet broad, with sloping roofs and a raised skylight running the whole length of the building. The beds were placed in four rows in the middle of the room. All the windows and doors were double and the rooms were heated by hot water pipes. The only means of ventilation provided was a casement  $8 \times 5$  inches in each window and this was only allowed to be opened under orders of the non-commissioned officer in charge of the room. The cubic space per head was 1,050 cubic feet. The rooms were kept at a temperature of about  $70^{\circ}$  F., during the winter. The differences in temperature between the interior of the buildings and the atmosphere was so great that sufficient interchange of air took place merely in consequence of opening and shutting the doors when anyone entered or left the room. Follenfant also thinks that possibly the raised skylight which permitted the sun's rays to act on the highest portion of the air in the room may have performed the functions of a disinfecting chamber.

C. E. P.

**Treatment of Heat-stroke.**—A note in the *Deut. Mil. Zeitschr.*, of April 5th, 1910, states the Medical Department of the German War Office recommends the injection of suprarenalin in cases of heat-stroke. Arrangements have been made to have a supply of this drug available during manœuvres.

**Course of Instruction for Delegates of Voluntary Aid Societies.**—January, 1910. D.M.Z., April 5th, 1910.—The seventh annual course of instruction for delegates of Voluntary Aid Societies was held in Berlin from February 14th to 18th, 1910; 110 delegates attended the course.

The first three days were devoted to lectures held in the Kaiser Wilhelm Academie (Army Medical School); the two remaining days were employed in visiting various establishments.

The lectures were delivered by senior officers of the Army Medical Service and two generals, members of the Central Committee of the Red Cross Society. The following subjects were dealt with:—

The establishment of general hospitals and the training of voluntary-aid nursing *personnel*; sanitation in the field; mental diseases in the army in war time; the organisation of the medical services in the field; evacuation of sick and wounded; treatment of wounds in recent wars, with a demonstration by X-ray pictures and preparations of injuries inflicted by bullets; the male *personnel* of the Red Cross Society, its training and employment on mobilisation; preparations for war to be made by the Red Cross Society: the development of German voluntary aid societies; the regulations under which the voluntary aid societies are incorporated with the army medical service and the responsibilities of delegates.

On the fourth day the delegates were conveyed by special train to Hohenlychen, where the several institutions founded and maintained by the Red Cross Society were inspected, especially the fresh air colony, the Cecilienheim, and the Victoria Louise Convalescent Home.

On the last day the delegates were shown over the Tempelhof garrison hospital, and were given a demonstration on the mobilisation equipment stored there for fitting up hospital and emergency hospital trains, water sterilizers and motor ambulance wagons. This was followed by a visit to the ordnance stores where a demonstration was given of the field medical equipment, including ambulance wagons, stretchers, hospital tents, field X-ray apparatus, &c., and a wheeled kitchen. On the conclusion of the course the delegates and instructors dined together.

C. E. P.

**The New German Medical Organisation for a Cavalry Division in the Field.** By Oberstabsarzt Boehncke in *Kavallerist. Monatshefte*, of March, 1910.—One of the most important changes introduced into the German Army Medical organisation in the field by the new Medical Field Service Regulations of 1907 concerns the medical organisation of a cavalry division. A new mobile medical unit, the “*sanitätsstaffel*,” has been introduced.

COMPARISON WITH NEIGHBOURING POWERS.—

	Germany, 1907	Austria-Hungary	France	Russia
Ambulance wagons	6	4 (4-horsed)	8	2 (1-horsed).
Medical supply wagons	1	3	8	8 (2-horsed). 10 (1-horsed).

The German Army has introduced a new pattern of ambulance wagon designed to carry a supply of medical and surgical material as well as wounded; this has permitted it to cut down the number of medical stores wagons to one.

The wagon takes two men sitting beside the driver, and can carry two lying-down patients on stretchers inside the wagon. The roof rests on supports, the space between being closed by waterproof curtains. In a compartment under the floor of the wagon are four zinc-lined boxes and a sliding drawer. These contain medicines, dressings and medical comforts. In the driver's box there are four water-bags, and under the

body of the wagon there is a water-barrel. If necessary, other articles, e.g., blankets and waterproof sheets, could be carried in the wagon. The wagon is lightly constructed and very strong; it can turn on its own ground and has proved itself capable of following cavalry anywhere. With each regiment of the cavalry division there are also two pairs of panniers; these contain a supply of medicines and dressings, and the canvas for four emergency stretchers, troopers' lances being used as poles. Each pair of panniers is carried by a led pack-horse. These are intended to accompany small detached parties or to remain with the pursuing cavalry while the wagons form a dressing station. For the whole cavalry division there is only one 6-horsed wagon for medical stores; this marches with the heavy baggage of the division, and is intended to carry medical and surgical supplies to replenish those of the ambulance wagons; it also carries twelve water hags, twelve emergency stretchers, three sets of cooking apparatus and two hospital tents.

The number of regimental bearers is not fixed, as many men as are required will be taken from the ranks (a certain number are specially trained as bearers). The author thinks that there will be some difficulty in obtaining men, as officers commanding will object to anyone leaving the ranks till fighting is finished, and a certain number of the trained bearers will probably be wounded themselves.

The medical organisation of a cavalry division is now as follows:—

*Personnel.*—1 A.M.O. with a mounted N.C.O. of the bearer company. Eighteen medical officers (three per regiment); thirty-six men of the medical troops (six per regiment); twelve mounted orderlies (two per regiment), each leading a pack-horse. Regimental bearers (number not fixed).

*Matériel* in addition to that carried by medical officers and orderlies:—

Twelve pairs of panniers on pack-horses, with twenty-four emergency stretchers.

Six two-horsed ambulance wagons, each carrying two stretchers, medical and surgical supplies and medical comforts.

One six-horsed store wagon with reserve supplies and tents; this remains with the heavy baggage of the division.

To the above must be added the *personnel* of the horse artillery brigade, viz: Two medical officers, two mounted medical corps men; 1 N.C.O. of medical corps, not mounted, who accompanies the light ammunition column; regimental bearers taken as required. Their *matériel* is:—

Two field medical companions.  
Two " " boxes, infantry pattern.  
Two folding stretchers.

When an engagement is imminent two-thirds of the medical *personnel* and equipment, with the exception of the pack-horse panniers, is taken to form a Sanitätsstaffel, i.e., dressing station, or, if necessary, even a temporary hospital; the remaining one-third is held in reserve either to accompany the cavalry if it pursues the enemy or to assist the dressing station party if they require help.

The administrative medical officer is attached to the staff of the general officer commanding and obtains the general's sanction before ordering the formation of a dressing station.

C. E. P.

**The Epidemic of Dysentery in the Camp of Exercise at Hagenau, in 1908.** (*Veröffentlichungen aus dem Gebiete des Militärsanitätswesens*, Heft 43, Berlin, 1910).

For many years dysentery has been endemic in lower Alsace, and the troops stationed in this district have always shown a much higher incidence of dysentery than those in any other army corps. The camp, which accommodates some 4,500 officers and men, has on several occasions been the means of spreading the infection in the 15th Army Corps; thus in the years 1874, 1875, 1877 and 1881 there were severe epidemics among the troops stationed there.

The epidemic of 1908 began in the middle of July. At first isolated cases occurred, but before long the number rapidly increased. By the 9th August fifty-three cases had been admitted to hospital; all of these came from the 2nd, 3rd, 4th and 5th squadrons of the 3rd Schlessische Dragoons, which were quartered in the old cavalry barracks. The 1st squadron occupied a new building away from the old barracks and with a separate kitchen; no cases occurred in this squadron. Other troops in camp remained healthy, and no cases were known to exist among the civil population. The epidemic therefore appeared to have originated in the above squadrons.

	Four Cavalry Regiments			Three Infantry Regiments and other details			Total
(1) Number of patients with characteristic symptoms of dysentery .. .. .	56	..	..	17	..	..	73
(a) Number of cases in which the bacillus was found.. .. .	44	..	..	16	..	..	60
(b) Number of cases in which the serum gave a positive reaction.. .. .	7	..	..	—	..	..	7
(c) Number of cases in which (a) and (b) were negative .. .. .	5	..	..	1	..	..	6
(2) Number of patients with doubtful dysentery .. .. .	75	..	..	23	..	..	98
(a) Number of cases in which the bacillus was found.. .. .	28	..	..	7	..	..	35
(b) Number of cases in which serum gave a positive reaction .. .. .	22	..	..	7	..	..	29
(c) Number of cases in which (a) and (b) were negative .. .. .	25	..	..	9	..	..	34
(3) Healthy bacilli carriers .. .. .	96	..	..	43	..	..	139
(4) Healthy men whose serum gave a positive reaction.. .. .	44	..	..	17	..	..	61

Suspicion fell on the kitchen and canteen *personnel*, as among the men detailed for duty was a dragoon who had suffered from dysentery, the diagnosis of which was confirmed bacteriologically, from August 31st to December 24th, 1906. The latrines used by the kitchen *personnel* were on the bucket system and situated close to the kitchen, both being infested with flies. A bacteriological examination of the stools of all persons employed in the kitchen and canteen did not detect any dysenteric bacilli in the case of the suspected dragoon, but gave a positive result in the case of a saleswoman employed in the canteen. This appeared to clear up the origin of the epidemic in the dragoon regiment.

Unfortunately cases began to be reported from the troops in Hagenau itself as well as from the troops in camp, two and a half miles distant from Hagenau. These could not be attributed to the same source as those

which had occurred in the dragoon regiment. It also now became known that a definite case of dysentery had occurred in the middle of July in the family of a shopkeeper in Hagenau.

The fact that most of the cases had been extremely mild, many of them never having applied for any treatment at all, is largely responsible for the epidemic having been permitted to become so widespread before serious preventive measures were taken.

The preceding table shows the distribution of cases by arms, as also the result of bacteriological examination.

The history of the epidemic as it affected each regiment is next given with tables showing the results of the bacteriological examination of each unit.

*Clinical Manifestations.*—Almost all the cases were extremely mild, and there were no deaths. Most of them presented the features of an ordinary catarrh of the bowel, and the diagnosis was only determined bacteriologically. The experiences of the Hagenau epidemic show that the less virulent types of dysentery bacillus do not produce any marked alteration in the character of the stools. This is specially so in the case of the "Y" bacillus, as has already been shown by Lentz and others. The grave symptoms which characterise the attacks caused by the Shiga-Kruse bacillus are entirely absent in the case of the "Y" bacillus; in fact, in many cases, the "Y" bacillus frequently fails to produce any noticeable disturbance of the digestive tract.

Generally the descending colon was tender on pressure, and remained so even after the attack had passed off. Mild pyrexia was noticed in about one-third of the cases. The later cases in the epidemic were, as a rule, more severe than the early ones. Convalescence was generally uninterrupted and complications were rare.

*The Specific Agent of the Epidemic.*—This was proved to be the "Y" bacillus which Kruse first described as the bacillus of pseudo-dysentery in asylums. It is closely allied to Flexner's bacillus and may easily be mistaken for it. The growth of the colony on lactose litmus agar is, however, characteristic. The bacilli appear somewhat broad, are easily stained with aniline dyes, but are negative to Gram. Other differential culture tests are given. A "Y" specific serum was prepared by inoculating rabbits, and its agglutinating properties were made use of to confirm the results of the culture tests. An interesting table is given showing the results of agglutination tests with the specific bacillus of this epidemic, and the following artificially prepared specific serums:—

Flexner, "Y," normal rabbit, para-typhoid "A" and para-typhoid "B" in different dilutions; the Flexner and para-typhoid "A" serums showed positive reactions in some cases in dilutions of 1 to 1,000 in the former and 1 to 200 in the latter; this confirms the observations of previous workers.

*The Bacteriological Examinations.*—Owing to the large number of these, the tests had to be made in the bacteriological section of the medical directorate of the 15th Army Corps in Strasburg.

On the afternoon preceding the day on which the examinations were to be undertaken, a sufficient number of Pétri dishes and *papier-maché* receptacles were served out to the troops. Each man had to show these labelled with his name at evening roll-call. The following morning a sentry was posted on the latrines to prevent anyone using them. The

men were then marched in small detachments to a specially screened-off enclosure where they had to pass their motions into the *papier-maché* receptacle, if necessary a soap suppository being used. The Pétri dish was placed beside the *papier-maché* receptacle and when the men had retired a specimen of the faeces was placed in the Pétri dish by a non-commissioned officer of the Medical Corps. The Pétri dishes were then packed up in order according to the nominal roll and despatched under the care of a lance-corporal by the early train to Strasburg. The whole procedure took about one hour for each company or squadron, and the material reached the laboratory about two hours after being passed. The *papier maché* dishes were burnt in a destructor. The total number of bacteriological examinations made was 8,707, and in 295 cases (= 3·4 per cent.) dysenteric bacilli were detected. Details of the method of examination employed are given.

*Results of the Examinations of Sick and Suspected Cases.*—Out of seventy-three patients the dysenteric bacillus was found in sixty (= 82 per cent.); among ninety-eight people who had suffered from suspicious attacks the bacillus was found in thirty-five (= 36 per cent); the low number is probably accounted for by the fact of the examination having been made at a late stage of the attack. The bacillus was found mostly on the second, third, and fourth days of the illness, but also at later stages, in one case even on the twenty-eighth day of the illness. As regards the period during which a carrier continues to pass bacilli, this was in one case found to be up to the 202nd day. The average, however, was about twenty-four days, and did not seem to depend on the severity of the attack. It therefore seems probable that the bacillus may produce some alteration in the wall of the bowel, which in turn favours a prolonged excretion of bacilli, and that this occurs more commonly than has hitherto been supposed.

The systematic examination of the troops led to the detection of 139 carriers among the apparently healthy men. None of these men gave any history of any suspicious attack, and at the time of examination believed themselves to be in excellent health. It is somewhat striking that among the sick and suspects the bacillus was only found 171 times, whereas among the apparently healthy men it was detected 139 times.

The serum agglutination tests were not on the whole satisfactory, as a positive reaction was also obtained with specific Flexner bacillus serum, but not in such high dilutions; in some cases normal human serum if only slightly diluted was found to agglutinate the "Y" bacillus.

*Epidemiology.*—In all of the cases the "Y" bacillus was the only one found. The spread of the epidemic was obviously due to contact infection. This was supported by the spot maps given at the end. The water supply was above suspicion.

In the village of Kattenhausen, which immediately adjoins the camping-ground, there are a number of inns near the entrance to the camp which are largely patronized by the troops. The sanitary conditions in these places were far from satisfactory, and the troops mixed freely with inhabitants of the neighbourhood. During the epidemic it was discovered that the landlord of one of these inns had a contract for emptying the camp latrines as well as for supplying milk to the dépôt canteens. To show one of the possible sources of the epidemic it may be mentioned that the following were found to be carriers of the specific

bacillus: A nursemaid, a waiter in the officer's mess, a contractor, the cook, and a woman in the depôt canteen; probably there were others as well. The local population appears to have acquired immunity, as newcomers were known to be specially liable to dysenteric attacks.

The mounted troops suffered much more severely than the infantry, and it is suggested that the litter in the stables may possibly be a favourable breeding-ground for the bacillus.

*Measures adopted to check the Epidemic.*—The first and most important step was to detect and isolate all those who harboured the bacillus. This was carried out as already described. All sanitary precautions, but especially the disinfection of linen, cleansing of barrack rooms, and a daily bath for each man, were rigidly enforced. All units which had shown any infection were inspected by a medical officer daily, and any suspicious cases sent to hospital. The latrine seats and receptacles were disinfected daily. On leaving the latrines each man was made to wash his hands in 5 per cent. cresol solution. The sick as well as suspects were isolated in hospital until three successive bacteriological examinations had proved negative. They were then kept under observation for ten days, and only allowed to return to duty if the fourth examination also proved negative. Companies in which any case had occurred were isolated, and not allowed to mix with any other troops until two bacteriological examinations had proved the absence of carriers. To avoid the risk of infecting villages lower down, bathing in the river was stopped during the whole epidemic. An infantry regiment which had been sent to the camp of exercise during the epidemic was at once sent back to its station.

The room corporal was ordered to examine the bedding at *réveillé*, and in case any stains were found on the sheets the occupier was marched to hospital; this several times led to the detection of mild cases. In consequence of the very thorough measures adopted the epidemic was completely stamped out by the end of September.

C. E. P.

**Sterilising the Hands of Typhoid Carriers.**—Gaebtgens (*Archiv. für Hygiene*, Bd. lxxii., Heft. 3, 1910, p. 233) has found that the usual mode of washing hands with soap, running water, and nail-brush, will reduce the number of typhoid and colon organisms on hands contaminated with typhoid dejecta, but will not eliminate them completely. The application of methylated spirit for half a minute is sufficient to destroy the *Bacillus typhosus* on the skin of the hands. Eau de Cologne is effective in a quarter of a minute, but 40 per cent. alcohol allows some of the bacilli to survive after two minutes contact. Antiformin, 2 per cent. crysoform, and 10 per cent. peroxide of hydrogen are not germicidal to the typhoid bacillus. The reviewer has ascertained that if a loop of an agar or broth culture of the *B. typhosus* is added to a few drops of methylated spirit, or spirit of wine, subcultures in broth or on agar remain sterile, though made immediately.

C. B.

## Correspondence.

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### SAND-FLY FEVER IN INDIA.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I read with interest Lieutenant-Colonel Birt's ingenious deductions *re* "Sand-fly Fever in India" in the August Journal. I was especially attracted through the fact that he quotes sixty-two cases in an epidemic in 1901 in Rangoon diagnosed as "influenza." I was the delinquent, for I commanded that hospital at the time. I plead guilty to wholesale maldiagnosis. I knew I was not dealing with malaria; I felt convinced it was not simple continued fever, for I did not know then, and I do not know now, what that disease is; I wavered between dengue and influenza, and finally adopted the latter as least committal. And after all these years I am found out! Deduction has floored me; it must have been sand-flies. Yet there still remains a leaven of unrighteousness. First and last, I have been nearly five years in Rangoon, and the 1901 fever was quite different from the types I saw in other years. Possibly there was a Cook's personally conducted sand-fly tour that year—I do not know. For my sins, I know the *P. papatasi* well, but I suppose I must have hurt his feelings somehow during those years in Rangoon, for he cut me dead whilst there. Apparently he must have buried the hatchet since then, if I may judge from his attentions in Poona two years ago; yet, curiously enough, we had not any "influenza" outburst in Poona then. I call it most inconsiderate in the face of incontrovertible statistics.

I am, &c.,

Bombay,  
August 28th, 1910.

R. H. FORMAN,  
Colonel.

Journal  
of the  
Royal Army Medical Corps.

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Original Communications.

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"MUHINYO." A DISEASE OF NATIVES IN UGANDA.<sup>1</sup>

BY COLONEL SIR DAVID BRUCE, C.B., F.R.S.,  
CAPTAINS A. E. HAMERTON, D.S.O., AND H. R. BATEMAN,  
*Royal Army Medical Corps,*  
AND  
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WHEN the Sleeping Sickness Commission passed through Kampala, the native capital of Uganda, at the end of October, 1908, on their way to their camp at Mpumu, they were informed by Sir Apolo Kagwa, K.C.M.G., the Prime Minister, that a new disease had broken out in the province of Ankole, and that many people were sick.

This is probably the same disease which was described by Dr. A. G. Bagshawe in 1906. He gives the history and symptoms of nine cases which he saw in Ankole. He concluded that the disease was beri-beri, and states that at one village 25 per cent. of the inhabitants were suffering from a more or less severe form of the disease.

In the same year Dr. L. D. Lowsley also described "Muhinyo," but was of opinion that it might possibly be dengue with persistent joint pains.

Nothing more seems to have been written about "Muhinyo" until the beginning of 1909, when Dr. A. C. Rendle reported its

<sup>1</sup> Reprinted from the *Proceedings of the Royal Society*, B. vol. 82.

presence in large numbers in the country round Lake Albert Edward. He says that all classes suffer, and that he has no hesitation in saying that "the disease is chiefly allied to kala-azar, the black death of India."

Thanks to the kindness of Sir Apolo Kagwa and Chief Saulo Mayanja Lumama, the Commission had an opportunity of seeing a case of "*Muhinyo*," which was sent to Mpumu from Ankole in January, 1909. This patient, who was said to have been ill for three months, was extremely weak and thin, but otherwise he showed no symptoms which pointed to any special disease.

As no other cases could be sent such a long journey as to Mpumu, it was decided that a member of the Commission should proceed to the district, in order to examine sick natives whom A. H. Watson, Esq., the District Commissioner, had kindly undertaken to have collected there.

On May 23rd, 1909, Dr. A. D. P. Hodges, the Principal Medical Officer, Uganda Protectorate, accompanied by Colonel Sir David Bruce, Director of the Commission, went to Masaka, on the borders of Ankole, where they found some fifty sufferers from this disease awaiting them.

#### DISTRIBUTION OF "*MUHINYO*" IN UGANDA.

The principal focus of the disease is along the eastern shore of Lake Albert Edward, which corresponds nearly to longitude 30 E., in the latitude of the Equator. The most severe cases have been met with at Katwe (Fort George), a settlement on the eastern shore of Lake Albert Edward. It appears to have spread down the eastern shore of this lake, and to have extended in a south-easterly direction into Ankole. Cases have been recorded as far east as the western shore of Lake Victoria, and as far north as the Katonga River, which runs parallel to, and about ten miles north of, the Equator. The disease is therefore quite limited in its distribution.

There is no evidence to show how it originated.

#### EPIDEMIOLOGY.

The tribes most affected by the disease are the Bakonjo and the Basongora. The former are morally and socially about the lowest class of people to be met with in Uganda. They are abjectly poor and dirty in their persons and in their habits. They live in rude grass huts, which they share with their domestic animals. The Bakonjo keep goats and, if they can afford them, cattle also. They prefer the milk of the cow, but also drink largely of goat's milk.



was neither kala-azar nor beri-beri, but the long duration of the fever, the joint pains, and the extreme weakness and emaciation suggested a continued fever, such as typhoid or Malta fever.

#### EXAMINATION OF THE BLOOD FOR AGGLUTINATIVE PHENOMENA.

The blood of several of these cases was therefore tested with *Bacillus typhosus* and *Micrococcus melitensis* by Widal's method, with the result that no reaction was obtained with the former, but positive results, in fairly high dilutions, were got with the latter.

The following table represents the result of the examination of the blood of "Muhinyo" with a strain of *M. melitensis* from Malta, from which it will be seen that five out of the seven cases examined gave a positive reaction:—

TABLE I.

Number of experiment	Dilution of serum			Control
	1 in 50	1 in 100	1 in 200	
927	+	+	-	-
928	+	+	-	-
929	-	-	-	-
930	-	-	-	-
931	+	+	+	-
932	+	+	+	-
933	+	+	-	-

#### ISOLATION OF THE MICROCOCCUS OF MALTA FEVER FROM THE SPLEENS OF CASES OF "MUHINYO."

The next thing to be undertaken was the isolation of the *M. melitensis* from the tissues of patients suffering from "Muhinyo."

The spleens of two cases (925 and 926) were punctured in the usual way, and the splenic pulp smeared on the surface of tubes of nutrient agar-jelly. Small white colonies were grown from both cases, and these were sub-cultured and used to study the morphology, cultural characters, and animal reactions of the organism of which they were composed.

*Morphology.*—Under the microscope the organisms were found to be minute micrococci, indistinguishable in size or appearance from the *M. melitensis*.

*Cultural Characters.*—In the same way it was found that the sub-cultures of the organism showed after some days as minute transparent colonies, resembling tiny drops of dew, which after-

wards became more opaque, and in no way differed from colonies of *M. melitensis* cultivated under the same circumstances.

*Animal Reactions.*—The sub-cultures were also emulsified in saline solution and injected into a monkey and rabbit. The monkey sickened with fever, and when the agglutinating power of its blood was tested with the strain of *M. melitensis* from Malta it was found to give a complete reaction in a dilution of 1 in 200. Having thus proved that two animals treated with the "Muhinyo" organism gave a serum capable of agglutinating a known *M. melitensis* from Malta, the converse experiment was made.

A rabbit was inoculated with the Malta strain, and its serum tested on the "Muhinyo" organism. This rabbit's serum, immunised against Malta fever, agglutinated the "Muhinyo" organism in a dilution of 1 in 200; and thus the proof that the micrococcus obtained from the spleen of "Muhinyo" cases and that obtained from cases of Malta fever were identical was established.

#### EXAMINATION OF GOATS FROM THE "MUHINYO" DISTRICT, TO ASCERTAIN IF THEY ARE RESERVOIRS OF THE VIRUS OF MALTA FEVER.

*By Vidal's Reaction.*—In Malta the Royal Society Commission discovered, in 1905, that the drinking of goats' milk was the sole mode of infection in Malta fever. Many of the Maltese goats were examined, and 50 per cent. of them found to be affected in some way by the disease, while 10 per cent. were actually excreting the *M. melitensis* in their milk.

It was therefore a matter of importance, as well as curiosity, to ascertain if the Ankole goats also suffered from Malta fever, and if the causation of this disease was the same in Central Africa as it had been proved to be on the shores of the Mediterranean, in the Soudan, and in South Africa.

When Sir Apolo Kagwa was approached as to the feasibility of obtaining goats from the most affected districts, he informed the Commission that he would see what could be done. About six weeks later a flock of goats, numbering in all twenty-four, was driven up to the laboratory at Mpumu, and it was stated that these had come from a place where "Muhinyo" was common. They were at once examined, with the result that the blood of three out of their number reacted to the strain of *M. melitensis* obtained from cases of "Muhinyo," and also to the Malta strain.

The following tables give the details :—

TABLE II.—MICROCOCCUS MELITENSIS ("MUHINYO" STRAIN).

Number of experiment	Dilutions of serum					Control
	1 in 10	1 in 20	1 in 50	1 in 100	1 in 200	
1512	+	+	+	—	..	—
1507	+	+	+	+	..	—
1776	+	+	+	+	+	—

TABLE III.—MICROCOCCUS MELITENSIS (MALTA STRAIN).

Number of experiment	Dilutions of serum				Control
	1 in 10	1 in 20	1 in 50	1 in 100	
1512	+	+	+	—	—
1507	+	+	+	+	—

*Isolation of the Micrococcus of Malta Fever from the Tissues of the Goats.*—After having found that some of the Ankole goats reacted to the agglutination test, an attempt was made to isolate the *M. melitensis* from their tissues. This proved successful in two cases. The following experiment gives one of these in detail :—

*Experiment 1475. Goat.*

August 11th, 1909.—This goat, which was one of a herd from Ankole, died this morning. The spleen was removed, and small portions of the pulp spread over the surface of agar tubes.

August 16th.—A growth consisting of several very small, round, white colonies appeared after three days. A stained preparation from one of these showed that they were composed of organisms resembling *M. melitensis*. Sub-cultures made.

September 29th.—The growth from two agar tubes was made into an emulsion with salt solution, and an agglutination test made with serum from a rabbit immunised against *M. melitensis*, Malta strain.

The result was that the organism from the goats agglutinated completely in a dilution of 1 in 100, and the proof was complete that the Ankole goats are liable to contract Malta fever, and to act as a reservoir of the virus.

CONCLUSIONS.

- (1) "Muhinyo" is Malta fever.
- (2) "Muhinyo" is conveyed from the goat to man by the drinking of goat's milk.

# MEDICAL HISTORY OF THE SOUTH AFRICAN WAR.

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*(Continued from p. 414.)*

## PART III. OTHER DISEASES.

(1) Up to this point, attention has been entirely directed to the general conditions affecting the incidence of disease, their results as shown in that incidence, and the special features of the development of the two epidemic diseases, with the lessons to be learned from them. It is now proposed to add a few notes on the other aspects of those "climatic" diseases shown by name in the tabular summary on p. 28, vol. i., 1910, and to consider in some detail the diseases grouped together in that summary as "other diseases," so far at least as they may prove interesting and instructive.

Enteric and simple continued fever form the subject of a special study by Lieutenant-Colonel H. H. Johnston, C.B., and will not be referred to in this place.

(2) *The Collection of Material.*—After the war, in order to make use of the experience which had been obtained in the field, a Committee was formed of officers who had had large personal experience during the campaign, whose duty was to collate all the available information and furnish a series of reports on such diseases as seemed to them important. These officers were Lieutenant-Colonel G. Coutts, Lieutenant-Colonel Culling, Majors H. B. Mathias, D.S.O., F. Smith, D.S.O., W. W. O. Beveridge, D.S.O., and W. F. Erskine. Much use has been made of their reports in what follows, and where possible, the source is directly indicated.

In addition to this, efforts were also made to obtain from the medical officers who had served in South Africa (both of the regular forces and the civil surgeons) statements of their experiences, but this met with very little success, due no doubt to several causes, of which one may mention: the pressure of other work, the desire for more immediate publication than was probable in a work more or less official, and in many cases to a desire, not unnatural, to hear no more of the war. It may also be pointed out that much had been published before the conclusion of the war, and that for the two or three years following its conclusion a good deal appeared in the general medical press. But a few very useful reports were received, some of which have already been used in the surgical history of the War.

In the following notes, only those points which appear to be of interest will be referred to; no attempt will be made to offer a complete account, which in the present state of knowledge is quite unnecessary.

(3) *Dysentery*.—Corrected incidence, 85·81. Mortality, 3·02 per 1,000.

(a) *Etiology*.—Much has been done since the period of the South African War. What could be said about South African dysentery at that time will be found in the section of the Report of the Commission on Dysentery and Enteric Fever in South Africa contributed by Colonel Sir David Bruce, F.R.S. From the clinical side, the important parts of his results are that, “dysentery in South Africa is not caused by amœbæ,” and that “there is a certain amount of evidence to show that so-called cases of dysentery following enteric fever are relapses of enteric, where the disease has attacked the large intestine.” At the same time, it may be pointed out that as a considerable number of men came from India, it is quite possible that, in the first place, a few cases of amœbic dysentery (contracted in India) may have been introduced into South Africa, and it is even possible that a limited infection may have taken place from them, though no such case came under the observation of Sir David Bruce. Lieutenant-Colonel C. Birt (*Brit. Med. Journ.*, November 9th, 1907, p. 1336) found one case of amœbic infection in fifty-five cases of dysentery.

(b) The epidemiological relations have been dealt with already. It may be pointed out that the great variations in temperature were probably efficient in producing relapses rather than fresh infections. Further, as the War went on, the teeth of the individuals of the force became more and more inefficient, and this with the prevalent oral sepsis, and the somewhat intractable field ration, tended to produce a state of chronic irritability of the bowel, which assisted the process of infection.

(c) *Varieties of the Disease*.—Previous experience in South Africa showed that the endemic dysentery, not uncommon, was of a mild type and rarely fatal. The mortality between 1859-73 was 0·66 per 1,000 of strength, and between 1884-98 but 0·30. The following case mortalities are useful for comparison:—

		Cases			Deaths			Case Mortality
S. Africa, 1886-98	..	758	..	..	16	..	..	2·11 ± 0·35
India, 1908	..	986	..	..	29	..	..	2·94 ± 0·36
10 campaigns*	..	3,053	..	..	124	..	..	4·06 ± 0·24
S. African War	..	38,108	..	..	1,342	..	..	3·52 ± 0·06

\* Shown in the table opposite p. 36. vol. xiv., 1910.

The case mortality in war is slightly higher than in peace, but the difference is not very great, and the only difference which is of real significance is that between the peace and war rates in South Africa. The comparison of case mortalities in dysentery is, of course, extremely unsatisfactory as a means of comparing types of disease, as so much depends on the proportion of the relapse cases to the fresh infections. In South Africa, experience before the war seemed to show that not only was the type of disease less severe, but relapses were much less common than in India; this comparative freedom from relapse probably did not continue during the war.

Where the number of cases admitted to hospital was as great as that which occurred in South Africa, anomalous cases were to be expected, and a certain number of these did occur. Such cases, however, are rather of the nature of curiosities, and it seems better to confine attention to the more usual forms, of which every variety was found. The following report by Lieutenant-Colonel G. Coutts and Major F. Smith, D.S.O., gives all that is necessary for the comprehension of the disease condition met with during the war:—

“Dysentery was usually preceded by diarrhœa of a somewhat acute type, characterised by much griping pain, copious watery evacuations, and a moderate amount of debility. This diarrhœa was generally cured by a few days' rest and dieting, and was distinct from the premonitory diarrhœa of dysentery itself.

“*Symptoms.* — The symptoms observed in South African dysentery were those usually described in epidemics elsewhere, except that there were, as already noted, a large number of very mild cases, which recovered after a few days' rest and a milk diet. In them the stools, although characteristic, were not numerous, and the pain and straining were often insignificant. The preliminary diarrhœa was observed, as a rule, but in some patients the dysenteric stools followed immediately on a condition in which the motions were composed of scybalous masses mixed with mucus, pale or blood-stained. In severe cases the stools were very frequent, were composed wholly of blood and mucus, and were passed with much pain and tenesmus. In bad cases hæmorrhage was not uncommon. In his report on No. 6 Stationary Hospital, Green Point, Lieutenant-Colonel H. O. Trevor remarks, that ‘hæmorrhage over and above the blood-stained mucoid stools common in the disease was a feature’ of the dysentery treated in that hospital. Greenish-coloured motions were sometimes seen, and in fatal cases the dejecta often lost their mucoid character, and resembled dirty water mixed with shreds and sloughs.

"The pain varied from slight griping and a feeling of soreness in the abdomen to acute agony; it was often located about midway between the umbilicus and the pubes, and was then of considerable diagnostic value. Pain of a burning character in the rectum was not uncommonly a symptom. In most cases of any severity tenderness was present over some part of the great bowel. Pain over the liver was noted in a considerable number of cases, with tenderness and enlargement of that organ. Strangury is frequently mentioned. Vomiting and hiccough complicated severe and fatal attacks, in which tympanites, profuse perspirations, and collapse were frequent terminal symptoms.

"Unless when it occurred at the commencement of an attack of enteric fever (a common event), dysentery was accompanied by an amount of pyrexia which was mild in comparison with the severity of the other symptoms.

"*Diagnosis.*—The inspection of the stools as an indispensable preliminary to correct diagnosis is not always easy on service in the field, but in view of the importance for successful treatment of early recognition of the disease, and from the fact that the patient's statements are often erroneous, it should never be omitted.

"The only conditions likely to complicate diagnosis in this respect were piles, constipation with the passage of mucus, and possibly rectal bilharzia; cancer of the rectum, for obvious reasons, was not a factor.

"A large number of patients was admitted to the hospitals for dysentery which merged into enteric fever, the latter running its usual course after the former had subsided. In these cases, apparently, both diseases were contracted at or about the same time, the dysentery manifesting its distinctive symptoms first, possibly on account of a shorter incubation period. The associated dysentery appeared to be of the catarrhal variety, and to yield readily to treatment, but it naturally added somewhat to the gravity of the prognosis.

"Men who were apparently convalescing from enteric fever not infrequently developed symptoms, which were often regarded as those of dysentery. But, as has been shown by Colonel Sir David Bruce, F.R.S., the dysenteric symptoms in such cases were, for the most part, due to an extension or recrudescence of the typhoid infection in the large intestine; although it is, of course, possible that a true dysentery followed an attack of enteric fever."

Major Erskine states that in Natal "with increasing frequency of the griping, straining, and diarrhoea the stools became more

mucous in appearance and then acquired a sanious colour, but, the amount of blood or shreddy mucus observed was never so great as seen in the form witnessed on active service in India."

(d) *Pathological Conditions*.—The following extracts from the same report deal with certain unusual points:—

"In the great majority of cases the dysenteric process was confined to the large bowel, but in a few it overstepped the ileo-cæcal valve, and involved the lower 5 or 6 in. of the ileum. In one remarkable case, described by Major Beveridge, the stomach presented the same appearances as the large intestine.

"The case which was treated at No. 19 General Hospital, Pretoria, in May, 1901, under the care of Captain Anderson, D.S.O., is thus described:—

"A sergeant of the Royal Garrison Artillery was admitted to hospital suffering from a very severe attack of acute dysentery, and developed great distension with much vomiting, hæmorrhage, and abdominal pain (referable to the area of the stomach), from which he died.

"On *post-mortem* examination it was found that not only was the colon the seat of extensive ulceration, but the stomach itself was in a similar condition. The mucous membrane was deeply infiltrated, granular, and undermined with extensive ulceration; in fact a typical dysenteric condition.

"The case was of particular interest, as it led to various opinions in regard to diagnosis, but dysenteric ulceration of the stomach was never suspected before death."

"Since observing the above case Major Beveridge reports that he has carefully examined the stomach in every fatal case, and has met with a similar condition in many instances, but not to the same marked extent. The parts affected were patches in the neighbourhood of the orifices and along the greater curvature, the condition varying from a gelatinous, granular infiltration, to marked ulceration.

"*Perforation*.—Perforation of the large intestine was occasionally found, mostly on *post-mortem* examination. It was met with in two out of 640 cases of dysentery in No. 20 General Hospital. In both of them the site of perforation was the posterior part of the cæcum. An abscess formed in each case, and was evacuated by an operation similar to that for appendicitis; one patient recovered, the other died. At the *post-mortem* examination it was found that another perforation had taken place at the hepatic flexure of the colon, an abscess had formed between the colon and the liver, and

other small abscesses were interspersed throughout the hepatic substance.

"At No. 17 General Hospital, two fatal perforations were noted among 2,336 cases of dysentery—both in the lower end of the bowel, and accompanied by peritonitis. A third case in which there was a small abscess of the right iliac fossa, as well as many in the liver, is not noted among the perforations, but may have been similar to those reported from No. 20 General Hospital.

"In a fourth case also under treatment in this hospital the patient, Lance-Corporal E., aged 32, service twelve years, was admitted on December 28th, 1901, with a history of dysentery for about fourteen days. He was incessantly purged and was passing much blood and mucus. Under treatment with magnesium sulphate the stools decreased in number, but he still continued to pass blood, and on February 4th, 1902, signs of perforation appeared and he died the same day.

"On *post-mortem* examination a perforation was found in the cæcum. The whole colon was extensively ulcerated and sloughy. The small intestine and liver were normal.

"At No. 2 General Hospital perforation with peritonitis occurred in four cases out of 1,036. The cæcum alone was perforated in two, cæcum and ascending colon in one, ascending colon in one.

"There was also a case of cæcal abscess (probably following perforation) among the officers, which is described as follows by Lieutenant-Colonel Sylvester, R.A.M.C. The patient, an officer of Irregulars, of very poor physique, was transferred to No. 2 General Hospital at the end of May, 1901. He had had dysentery in Natal in 1900, and for a month had been complaining of pain about the cæcum, where there was some tenderness, but no swelling to be made out.

"Towards the end of June a swelling appeared over the liver just under the ribs and aspiration drew off pus. On July 7th the abscess was opened, and a large cavity found extending downwards between the ribs and liver, the substance of which was eroded. A counter-opening was made in the ninth intercostal space in the axillary line, and a large quantity of chocolate-coloured pus evacuated. The discharge from this abscess gradually diminished, but at the end of August a painful swelling appeared over the cæcum. This was explored on September 12th, and a mass of inflammatory tissue found on opening the peritoneum, but no pus. Next day, however, faecal-smelling gas came from the wound, followed by pus

and faecal matter. After this there was a constant discharge of faeces from the wound; he became gradually weaker and extremely emaciated, and died on January 13th, 1902.

"*Post mortem*.—It was found that the caecum had been practically destroyed by dysenteric ulceration posteriorly, and an abscess had formed which had tracked up behind the ascending colon, and then come forward below the liver and between it and the ribs. It had also burrowed into the pelvis, and through the obturator foramen into the thigh.

"At No. 4 General Hospital perforation was found in two cases, there being three perforations in the lower part of the bowel in one, and one perforation, 12 inches below the caecum in the other.

"A case is reported from No. 7 General Hospital, in which there were two perforations below the ileo-caecal valve; another from No. 10 General Hospital, in which the gut was ruptured in the lower part of the descending colon. This was the case of Private A. H., aged 34, admitted on April 16th, 1900, with acute dysentery. The stools were very frequent, consisted mainly of blood and mucus, and were accompanied by much pain and tenesmus. Under treatment they became more feculent, but continued frequent; the patient became very exhausted, and the temperature subnormal, and on April 30th he fell into a state of collapse and died.

"At the *post mortem* there was a perforation in the lower part of the descending colon, permitting escape of bowel contents. The whole of the large intestine was inflamed and softened, but also presented the marks of old healed ulcers. The right lobe of the liver contained about fifteen small abscesses the size of a pea.

"A case was under treatment in No. 18 Stationary Hospital, Krugersdorp, in which a chronic ulcer in the splenic flexure of the colon had given way, and led to the formation of a large abscess behind the stomach.

"The large proportion of cases in which the first portion of the great bowel was perforated is noticeable; this accident being, according to the above figures, about twice as common in the caecum and its neighbourhood as in the lower part of the bowel.

"Localized peritonitis causing adhesions of the large intestine to neighbouring organs was not uncommon."

Perforation is not a common complication of bacillary dysentery. Vaillard says: <sup>1</sup> "Si la perforation est très rare dans la dysenterie des

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<sup>1</sup> Nouveau Traité de médecine, vol. 6, p. 252.

climats tempérés, elle l'est beaucoup moins dans celle des régions tropicales et surtout dans la dysenterie amibienne." Ruge,<sup>1</sup> in a footnote to a report on dysentery from Tientsin by Haasler, points out that the not uncommon occurrence of deep ulceration producing perforation and peritonitis points to an amœbic infection, possibly with a bacterial infection also.

"Hæmorrhage occurred in a considerable number of the severe forms of dysentery in which extensive ulceration and sloughing of the bowel were found on *post-mortem* examination. It is mentioned as the immediate cause of death in one patient under treatment at No. 2 General Hospital."

(e) *Septicæmic or Pyæmic Complications*:—

"An articular affection<sup>2</sup> was noted as an occasional complication. Two cases were mentioned in the report of No. 2 General Hospital, in one of which the knee-and ankle-joints were enlarged but not painful; there was but slight exacerbation of the temperature. In the other, the onset of the joint affection was accompanied by a slight relapse of the dysenteric symptoms. The part first affected was the metatarso-phalangeal joint of the great toe, and it resembled an attack of gout. In rapid succession both knees and both ankles were attacked. There was a good deal of pain and some fever. Treatment with salicylates was ineffectual, but the swellings gradually subsided. A few similar cases, where several joints were affected, occurred in other hospitals.

"Cultures obtained in this and four similar cases, examined by Major W. W. O. Beveridge, D.S.O., showed the presence in the blood of the *Staphylococcus pyogenes albus*. He states that in all the five cases blood was taken with the strictest antiseptic precautions, during the continuance of the fever and swelling, and between the second and eighth days, and in all the microbe was obtained in pure culture.

"As a control, blood was taken from cases of dysentery which showed no complication of this nature, and in each case the blood was sterile. The cultures were made in each case on agar and blood serum.

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<sup>1</sup> Mense's Handbuch

<sup>2</sup> This articular affection is not common in the cases seen in the Service. Ruge, however, points out (*loc. cit.*) that it is the most frequent complication of bacillary dysentery, even in the mildest cases. Vaillard says that these attacks are not rare. Dantec points out that they are due to secondary infections and do not differ from the arthropathies found in other diseases, such as small pox and scarlet fever; the proportion of such attacks varies in different epidemics.

"A case is recorded at No. 2 General Hospital as having been treated for enteric fever, in which, at the *post-mortem* examination, abscesses were found in the brain, lung, and liver, and the large intestine showed the presence of old dysenteric ulceration.

"Pericarditis with effusion was found in a few cases, and as a rare complication the cardiac valves were affected in the course of an acute attack, a septic ulcerative endocarditis supervening.

"(f) *Treatment*.—In approaching the subject of the treatment of dysentery, it is important to remember that the disease, in its early stages, is very amenable to efficient medication, whereas the complaint, when firmly established, is apt to be very intractable, and to result in chronic ill-health and death. Observation of the general run of dysentery cases admitted to the hospitals during the campaign, appeared to show that the importance of early diagnosis was perhaps scarcely sufficiently appreciated by the mass of medical men. The need for the early recognition of enteric fever was more generally admitted, although it would seem that prompt diagnosis is less urgently required, as regards immediate drug treatment, than in the case of dysentery.

"It is true that the nature of the operations, the enormous tracts of country over which they were spread, and the conditions under which the sick had to be transported, interposed formidable obstacles to the early and efficient treatment of dysentery patients. But the importance of rest in bed, suitable food, and early drug treatment, sufficiently well known before to experienced medical officers, was often, for the above reasons, unavoidably demonstrated by the deplorable condition of those patients who had to make long journeys (from Paardeberg, for instance, to Modder River or Kimberley), before reaching the shelter of the stationary hospitals, and for those patients, as well as the victims of enteric fever and other acute diseases, there can be no question of the advantage that would accrue if fully-equipped hospitals could be brought within easy reach of the troops in the field.

"Apart from the dietetic treatment of dysenteric patients, two main lines of medicinal treatment were followed during the campaign, those, namely, of ipecacuanha and salines. Both are time-honoured remedies, although it is uncertain to which priority is due. They are both mentioned by Sir John Pringle and Donald Munro, who practised as Army surgeons some one hundred and fifty years ago.

"Ipecacuanha, which has been used successfully by generations of physicians in India, was held, for the most part, to have failed in

South Africa. Yet, where the patient was treated as well as the disease, a certain measure of success attended its administration in the hands of some medical officers. Lieutenant-Colonel Ferguson, C.M.G., who was stationed at Waterval Onder, says that 'Ipecacuanha in 20-grain doses night and morning, with complete rest and plain milk diet, effected a marked improvement in a couple of days. Only on two occasions did the specific effect of this treatment appear to be delayed. The saline treatment was never resorted to.' In his report on dysentery in No. 4 General Hospital, Lieutenant-Colonel Johnston remarks that 'a saturated solution of magnesium sulphate was much in favour, but the results obtained did not appear to be so good as those of ipecacuanha, with all due precautions taken to prevent nausea and vomiting, and in some cases in which the former method of treatment failed, and the patient's condition was becoming serious, the administration of large doses of ipecacuanha brought about a speedy recovery.'

"On the other hand, the Officer in Charge No. 17 General Hospital, Standerton, reports that 'ipecacuanha, which is a specific in Southern India, is a failure in South Africa.' The best treatment was 'the free use of salines combined with morphia, at night, to secure rest and sleep.' The use of magnesium sulphate alone, or in combination with the soda salt, was followed by speedy recovery in a large proportion of the cases. It was commonly given in drachm doses every hour for thirty-six or forty-eight hours, the therapeutic effect being, apparently, to irrigate the bowel, and to replace the blood-stained mucoid stools by normal feculence.

"To explain this discrepancy in the results of treatment, it has been assumed that different forms of dysentery were met with. Thus, Lieutenant-Colonel Twiss, in charge of No. 20 General Hospital, was of opinion that many of the cases treated were mere catarrhal inflammation of the lower bowel, and that they were distinct from the real dysentery of other tropical and sub-tropical countries. In the former class of cases, a cure was, as a rule, easily effected by castor oil or salts; 'in the latter, the disease defies these, and often ipecacuanha,' as well as other forms of treatment.

"Major Beveridge adopts this view, remarking that the reason why so many medical officers were inclined to doubt the efficacy of ipecacuanha, was due to its being applied as a routine practice, without regard to the different types of the disease. He continues: 'In my experience ipecacuanha in the large doses given with such good effect in tropical dysentery was only of value in those cases which were clearly of amoebic origin, and, as a rule, entirely failed

in the ordinary bacillary type.' But, as already stated, the existence of the anaëbic form of dysentery in South Africa is very doubtful.

"He adds that ipecacuanha sine emetine is valueless in these cases, as are also small doses of ipecacuanha, which must be given in doses of 20 or 30 grains, and repeated if necessary. Major Smith, D.S.O., on the other hand, reported that he obtained good results with the tablets of ipecacuanha sine emetine, and it is possible that a too sparing use of the drug, with or without the emetine, accounted for some of the failures.

"Major Beveridge, speaking from an experience of the treatment of over 500 cases of South African dysentery, and the trial of various remedies, recommends the following combination as giving the best results in what he calls the 'bacillary' type of the disease:—

Pulv. ipecac. co.	..	..	..	..	gr. x.
Bismuth subnit.	..	..	..	..	gr. xx.
Salol ..	..	..	..	..	gr. x. to xv.

"This is given three- or four-hourly, according to the severity of the case, and he finds that it relieves distension and tenesmus, and quickly reduces the number of stools.

"He is not in favour of sulphur, which was largely prescribed at one period of the war and highly spoken of by some, being of opinion that it is apt to cause distension, and from its granular nature is liable to irritate the ulcerated bowel. He states that at *post-mortem* examinations he found the ulcerated surface of the colon covered over in patches with a layer of granular deposit of sulphur and sulphides.

"Solution of mercury perchloride was prescribed by some on account of its supposed antiseptic action on the intestinal tract, and izar in combination with bismuth found favour with others, but as far as can be judged from the notes of cases so treated, these drugs were of doubtful value. *Monsonia ovata* was favourably reported upon by Major Moffet at Norvals Pont, but is said to have proved unsuccessful by the medical officer in charge of No. 19 Stationary Hospital at Harrismith. It was much used in Natal, but did not seem so useful in the Transvaal.

"From a critical examination of the details of drug treatment in dysentery, given in the records\* of the hospitals, we are inclined to think that the rest and warmth of bed, milk diet, and a purgative to thoroughly clear out the intestinal tract, were the main elements of success in the ordinary run of cases.

"Where the disease assumed what may be called a malignant type with much ulceration, suppuration and sloughing of the inner coats of the bowel, drug treatment by the mouth was apt to fail, and irrigation was then had recourse to, with solutions of boracic acid, Condy's fluid, nitrate of silver, &c.

"The paramount importance of rest in bed, suitable dietary and early medicinal treatment are, as regards the treatment of dysentery, the main lessons of the war; and to these may be added a skilful selection of remedies to suit individual cases, and an avoidance of routine treatment.

"As regards dietary, some difficulty was experienced, in the earlier stages of the campaign, in procuring an adequate supply of fresh milk, but preserved milk formed an efficient substitute, and in course of time, arrangements were made for the constant supply, to stationary hospitals, of the fresh article in fair abundance. Civil Surgeon W. Rous Kemp, employed at No. 4 General Hospital, Mooi River, strongly recommends the white of egg as a valuable food in very severe cases with frequent stools, tenesmus, and vomiting. The white of one egg was beaten up and mixed with one large bottle of soda water, as many as twelve or eighteen eggs being used in the twenty-four hours. No milk or brandy was given, as the latter had a tendency to increase diarrhoea, and the former to cause sickness. When the stools became less frequent, raw beef juice, with an ounce of port wine added, was allowed three times a day, in addition to the white of egg. Lime juice sweetened with sugar and diluted with soda water, was given as a beverage.

"The segregation of dysentery patients, the disinfection of their clothing and bedding, and the destruction or disinfection of the excreta, were, as time went on, as carefully attended to, in stationary hospitals, as in the case of enteric fever. The occurrence of dysentery in patients under treatment for other diseases suggested the necessity of these precautions, which must now be regarded as necessary elements of success in the prevention of epidemics of the disease."

It was frequently assumed in South Africa, as it is still assumed elsewhere, that the success or failure of the normal treatment with ipecacuanha was sufficient to determine the diagnosis of amœbic or of bacillary dysentery. This is not, however, a sufficient means of diagnosis. There is little doubt that in India, ipecacuanha has what one must term a specific action in amœbic dysentery, of which the strongest evidence is in the success of Roger's method of treating

the early stage of hepatic abscess.<sup>1</sup> Also as there is a special "Brazilian" method of administering ipecacuanha, it may be assumed that it is exceptionally useful there also. But this is not always the case. Ruge,<sup>2</sup> whose experience is apparently chiefly on the West Coast of Africa, points out that ipecacuanha is to be avoided, and quotes J. H. Ford,<sup>3</sup> who states that under some conditions, the administration of ipecacuanha in such cases may be directly fatal. As a matter of personal experience in Natal before the war, ipecacuanha did not give those satisfactory results which one would expect in India.

It must not be forgotten that while amongst us, the choice is habitually between ipecacuanha and sulphates, the German and French schools use other modes of treatment for both forms of infection and with good results.

It would be difficult to say whether or not a "catarrhal inflammation of the lower bowel" was a true dysenteric infection or not without bacteriological examination. There do not appear to be any valid grounds for making this distinction in view of the innumerable infections which may cause the group of symptoms which we term dysentery.

(4) *Hepatic Abscess*.—(a) The following table shows the numbers of cases of hepatic abscess and hepatitis recorded by us compared with the admissions and deaths from dysentery:—

Group	DYSENTERY		HEPATIC ABSCESS		HEPATITIS		TOTAL	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Regulars and Volunteers	31,287	1,106	150	77	633	16	783	93
Imperial Yeomanry ..	2,591	90	9	7	23	0	32	7
Colonials .. .. .	4,230	147	25	13	68	1	93	14
Total .. .. .	38,108	1,343	184	97	724	17	908	114

The corrected mortality per 1,000 for *hepatic abscess* and *hepatitis* taken together is as follows:—

Regulars and Volunteers, 0·27; Imperial Yeomanry, 0·28; Colonials, 0·17; Total, 0·26.

These two pathological conditions must be taken together in order to get results comparable with those in South Africa before the War, as follows: 1859-73, 0·55 per 1,000; 1884-98, 0·38 per 1,000.

<sup>1</sup> Leonard Rogers, "Fevers in the Tropics," &c.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> *Journal of Tropical Medicine and Hygiene.*

The mortality from *hepatitis* and *hepatic abscess* was then less during the War period in South Africa than during the preceding years. The influence of alcohol is so marked in the production of this complication, that there is probably no error in attributing the diminution, in part at least, to the increasing sobriety during the later years of the century, and especially to the general abstinence obtaining during the War period.

Taking the deaths from *hepatic abscess* in relation to the total deaths from dysentery, plus hepatic abscess, we find in the Regulars and Volunteers the proportion is 1 in 15; in the Imperial Yeomanry, 1 in 14; in the Colonials, 1 in 12; and over the whole, 1 in 15.

For comparison, Waring found in India an average proportion (of hepatic abscess in fatal cases of dysentery) of 1 in 4·2; Fayrer, 18 per cent., or rather less than 1 in 5; Hirsch, by collating the available statistics, 19·2 per cent., or about 1 in 5; MacCallum (Baltimore), 1 in 4·2.<sup>1</sup>

There are several fallacies in the statistics relating to hepatic abscess. In the first place, the return of a fatal case, where the treatment in hospital has been continuous, may be under the heading of the primary disease, dysentery, or the complication hepatic abscess; there is not sufficient uniformity of practice in this respect. Again, where abscess is found in the liver at the autopsy, where, however, it has not been the immediate cause of death, it usually fails to take its place in the statistical returns. Hence as the deaths from dysentery in this way usually contain some in which hepatic abscess actually existed, the proportion of this complication is usually recorded as rather less than the actual results. Under peace conditions, over a large area such as India, this probably adjusts itself, and different periods are comparable. Conditions were somewhat different in South Africa, autopsies were by no means so common as in India, and probably some of the cases of abscess failed to be recorded on this account.

But, allowing for these fallacies, the proportion of hepatic abscess to the total deaths from dysentery must have been much smaller than in India, certainly not exceeding one-half, and probably even less than that.

Lieutenant-Colonel Coutts and Major Smith make the following remarks :—

“(b) The liver in severe cases of dysentery was often enlarged and fatty; in some there was perihepatitis with glueing of the

<sup>1</sup> W. G. MacCullum, Mense's Handbuch.

organ to the diaphragm and neighbouring viscera; but the most striking phenomenon in connection with the liver was the presence of abscess.

"An idea prevailed in the earlier part of the War, that liver abscess did not occur in the dysentery of South Africa, but this was very far from being the case. The frequency of its incidence is difficult to estimate, owing to the fact that in a large number of fatal dysenteries the liver was not examined. The report of No. 2 General Hospital, for example, mentions only seven instances in which liver abscess occurred, out of a total of 2,172 dysenteric patients; No. 19 Stationary Hospital, Harrismith, at most five among a total of 705; No. 4 General Hospital, twenty-two in a total of 1,605, while the report of No. 14 General Hospital, Newcastle, states that among 822 cases of dysentery with twenty-two deaths, abscess of the liver supervened in only one or two instances, and Major Moffet, writing of Orange River, where he had 402 admissions for dysentery, says, that he did not see a single case of abscess of the liver.

"On the other hand, in fifty-seven cases of dysentery, collected from various sources, and in which a necropsy was made or (in a few instances) pus found by operation on the liver, abscesses were found in thirty-six. These figures doubtless overstate the incidence of liver abscess in dysentery; *post-mortem* examination would be likely to be held more frequently in cases which were complicated with symptoms of liver mischief than in those that appeared to be uncomplicated, but even in the latter the small multiple abscess might exist without giving rise to symptoms. Indeed the records expressly state that small abscesses were found *post mortem*, which had not been suspected during life.

"The abscess was in the majority of cases the multiple, or so-called pyæmic form. Of the thirty-six cases above mentioned, not more than six were single; in the remainder the number varied from two to 'myriads.'

"As regards size, they varied from a pin's head to a condition in which the liver (in one case) was described as a 'bag of pus,' the wall of the abscess being composed of softened liver tissue about half an inch in thickness.

"The size of the multiple abscesses most commonly met with was about  $\frac{1}{4}$  inch in diameter; they were mostly circular, and their contents consisted of necrotic liver cells, and some yellow or greenish-coloured pus. A common condition was the existence of one or more abscesses of considerable size, with a variable number

of smaller abscesses. The genesis of the multiple abscess is generally explained on the assumption of a secondary invasion of pyogenic cocci, although, according to Major Beveridge, the *Bacillus coli communis* is also responsible for their presence.

"The following is Major Beveridge's report of the microscopical examination of these abscesses:—

"There is no formation of an abscess wall.

"The suppuration evidently begins in the periportal connective tissue, the pus frequently being of a yellow to greenish hue, and may contain particles of pigment.

"The liver tissue around is compressed, and the hepatic cells enlarged and granular, or in a necrotic condition.

"The contents of the foci consist of pus cells and necrotic liver cells, amongst which can be detected small masses of micrococci or colon bacilli. The outline of the abscess cavity has no definite structure, and is surrounded directly by the necrosed liver tissue, which presents a ragged outline towards the abscess cavity.

"Externally the liver substance is infiltrated with leucocytes."

"As already pointed out, the existence, in South Africa, of a so-called tropical form, due to amœbæ, is very doubtful. In the few cases, which were examined microscopically and bacteriologically, the amœbæ were rarely found, and the pus was sometimes sterile, but the amount of work done in this direction was too limited to justify any conclusion either way. Judging, however, from the broad facts of naked-eye pathology, it seemed possible that all liver abscesses were the result of one and the same process. The smaller form of abscess varied greatly in numbers and position, and where one or two large abscesses were found, it appears feasible to suppose that owing to diminished virulence, or increased resistance on the part of the patient, the morbid action was limited to one or two areas of the liver, which by gradual enlargement of separate foci of suppuration were broken down into large cavities."

(c) Several points may be noted in relation to the nature of these abscesses. The fact that multiple abscess was the predominant type does not of itself exclude an amœbic origin, for although the solitary abscess is the classical type, it is now known that amœbic infection may produce an exceedingly large number of foci, and in addition, the duration of the case and surgical interference by an open operation have an important influence in increasing the chance of a secondary, bacterial infection.

On the other hand, in reading over the reports of the cases, the frequency of severe ulceration of the bowel is striking. As has

been pointed out by Davidson and others, the true pyæmic abscess appears to be most common in cases with extensive ulceration. In sixty-one cases reported by Davidson,<sup>1</sup> nine non-dysenteric cases showed a definite portal phlebitis, the remaining fifty-two showed various lesions of the gastro-intestinal tract or its annexes, and of these, thirty-seven were consequent on dysentery.

On the whole, the prevalence of hepatic abscess gives little assistance in determining the degree to which amœbic infection existed in South Africa, but taken with the comparative frequency of perforation, it suggests that amœbic infection was perhaps less rare than the bacteriological findings appear to show.

(5) *Malarial Fevers*.—Corrected incidence, 56·64; mortality, 0·20 per 1,000.

There is little to be said about malarial fever in South Africa. In Cape Colony, and the Orange River Colony, there are no infected localities. In Natal and Zululand, the coast-belt is infected, it, however, formed part of the area of operations only for a very short time. The greater part of the Transvaal is also free from infection, but the Krokodil Valley below Waterval Onder was highly infected, while Barberton and the De Kaap valley are infected to a less degree. The bushveldt north of Pretoria and part of the country north of the line to Delagoa Bay were also infected. The contingent that landed at Beira and passed through Rhodesia was severely infected in passing through the coast-belt. They, however, do not appear in our returns.

Komati Poort, at the lower end of the Krokodil Valley and on the frontier between the Transvaal and Portuguese East Africa, was the only place in which malarial fever was of serious importance. The position necessitated the presence of a garrison, who suffered severely during the hot season after our occupation. The sanitary conditions were very bad, but by a vigorous anti-malarial campaign, including the prophylactic use of quinine, by improvements in the drainage and by the erection of hut barracks at a considerable height above the town, the prevalence was very greatly diminished. A hospital ship was maintained in Delagoa Bay, to which cases were sent from the hospitals at Komati Poort and Barberton with the most satisfactory results.

In spite of these measures, which diminished the incidence, the troops who first occupied the zone were saturated with malaria, so much so that their disposal was a matter of some difficulty.

Lieutenant-Colonel N. C. Ferguson, C.M.G., has furnished some

<sup>1</sup> Clifford Albutt's "System of Medicine."

notes on malarial fevers as seen by him in the hospital at Waterval Onder. This station is at the foot of the rack railway which led from the last station on the higher veldt, Waterval Boven, and 686 feet below it. A local resident, the hotel-keeper, stated that before 1900 he had not noticed mosquitoes in the vicinity and that no cases of malarial fever had originated there. His local interests may have influenced this observation. But in the beginning of February, 1901, cases of a malignant infection first occurred in men of the Liverpool Regiment who had not served in a malarial country, nor east of Waterval Boven; further cases occurred during the remainder of the month, and "in March, and still more in April, malarial fever of local origin became so common that it ceased to be specially noticed. It lessened in May, and since June only a few cases have been observed, which were probably recrudescences," that is, an autumn epidemic.

It is rather surprising that practically no development of malaria has been observed along the eastern line, as the carriages which run between Pretoria and Lourenço Marques are infested with mosquitoes brought up from the valley. During the War, special measures were taken to eliminate these mosquitoes. The epidemic of malaria in Natal in 1905 is to be remembered in this connection. There, *Anopheles* are always present, and there is a limited infection in the persons of the indentured Indians, especially along the coast-belt. But only in that one year has anything of a general prevalence been noted.

Lieutenant-Colonel Ferguson notes the frequency of pernicious symptoms, even in apparently mild and uncomplicated cases. These were usually of the algid type; hyperpyrexia was only observed twice, in patients of great muscular development. No case of black-water fever was observed, probably because of the short period of exposure to infection.

(6) *Comparison of the War Period with that immediately preceding it.*—Having dealt with those diseases conveniently termed "climatic," before proceeding to consider the "other diseases" in some detail, it is useful to compare the whole incidence of disease during the campaign with some standard, and the most appropriate comparison is with the disease incidence in South Africa during the ten years immediately preceding the War period. This comparison is presented in the accompanying table, in which some rearrangement of the current classification has been needed, as shown therein.

The main results are as follows:—

(a) The total disease incidence during the War was 843 per 1,000, as against 738 in the previous period, or a net increase of 105

per 1,000. This is the resultant of a very great increase in "climatic disease" (252) and a large decrease in all other diseases taken together (147). The increase in the mortality (19) is due entirely to that from enteric fever and dysentery.

(b) The net decrease in general diseases, excluding those termed for convenience "climatic," is 126 per 1,000. There is a small decrease in mortality also, 0.62.

This is the resultant of a small increase (70), of which debility contributes more than half, two highly infectious diseases, measles and influenza (which occurred in comparatively widespread but short epidemics) contribute one-fifth, while rheumatism accounts for the remainder, and of a large decrease (196) in the remainder of the group, of which syphilis and gonorrhœa together account for 186. These differences are such as might have been expected under war conditions.

(c) Local diseases show a small net decrease (22). Those of the generative system (in which venereal sore has been included on both sides) show a decrease of about one-half. Others which show a decrease are mainly those in which a man anxious to do his duty could go on without much difficulty, *i.e.*, those of the lymphatic system, of connective tissue, and of the skin. The last two results, however, are somewhat surprising.

The local diseases in which an important increase appears are those in which (with one exception) the conditions of field service might be expected to prove effective in increasing prevalence, *i.e.*, diseases of the nervous system, of the circulation, digestion, and of the organs of locomotion. Nervous diseases increased rather more than one-quarter, those of the circulatory system are about doubled, those of the digestive system increased about one-third. Diseases of the respiratory system, on the other hand, show an increase of rather less than one-tenth, and about two-thirds of these admissions were due to catarrhal bronchitis.

(d) As regards mortality, in the general diseases, there is no very important difference. The decrease in that from tubercular disease is (if real) probably due to the more rapid invaliding which took place during the War. Mortality from diseases of the respiratory system was more than doubled (almost entirely from pneumonia) and that from diseases of the digestive system increased by about one-half, mainly due to deaths from hepatic abscess and peritonitis.

The general results show that apart from the two epidemic diseases, field service in South Africa is on the whole not less healthy than garrison life in that country. They also emphasise the necessity for the elimination of epidemic disease.

## COMPARATIVE RESULTS—WAR PERIOD AND DECADE, 1888-1897.

Disease	WAR PERIOD		1888-1897		INCREASE		DECREASE	
	Incid.	Mort.	Incid.	Mort.	Incid.	Mort.	Incid.	Mort.
Climatic, less diarrhœa ..	346·73	21·33	94·8	2·19	251·9	19·14	..	..
Other general diseases ..	181·25	0·55	306·7	1·17	..	..	125·5	0·62
Local diseases ..	314·98	2·68	336·7	1·82	..	0·92	21·7	..
All diseases ..	843·07	24·58	738·2	5·18	104·9	19·4	..	..

## DETAIL, OTHER GENERAL DISEASES.

Disease	WAR PERIOD		1888-1897		INCREASE		DECREASE	
	Incid.	Mort.	Incid.	Mort.	Incid.	Mort.	Incid.	Mort.
Other eruptive fevers ..	3·50	—	1·1	—	2·4	..	..	..
Influenza ..	20·02	—	8·4	—	11·6	..	..	..
Septic disease ..	1·21	0·07	1·7	0·10	..	..	0·5	..
Tubercle ..	2·89	0·25	3·0	0·63	..	..	0·11	..
Syphilis ..	19·41	0·01	120·9	0·21	..	..	101·5	..
Gonorrhœa ..	19·23	—	103·7	—	..	..	84·5	..
Parasitic diseases ..	7·34	—	12·0	—	..	..	4·7	..
Alcoholism ..	1·09	0·02	2·5	0·03	..	..	1·4	..
Rheumatism ..	55·09	0·05	37·5	0·10	17·6	..	..	..
Debility ..	46·77	0·02	9·5	—	37·3	..	..	..
Other diseases ..	3·38	0·05	6·4	0·10	..	..	3·0	..

The following diseases which are not represented at all in the period 1888-1897 give a total incidence of 1·3: Small-pox, plague, dengue, diphtheria, Mediterranean fever, scurvy.

## DETAIL, LOCAL DISEASES.

Disease	WAR PERIOD		1888-1897		INCREASE		DECREASE	
	Incid.	Mort.	Incid.	Mort.	Incid.	Mort.	Incid.	Mort.
Nervous ..	11·49	0·20	9·0	0·42	2·5	..	..	0·22
Eye ..	11·43	—	13·7	—	..	..	2·3	..
Ear and nose ..	8·94	0·00	9·8	—	..	..	0·9	..
Circulation ..	19·67	0·38	9·1	0·32	10·6	..	..	..
Respiration ..	30·66	1·29	28·1	0·42	2·6	0·87	..	..
(1) Digestion ..	142·07	0·66	107·7	0·45	34·4	0·21	..	..
Lymphatic ..	5·05	—	23·8	—	..	..	18·8	..
Urinary ..	4·13	0·13	2·4	0·18	1·7	..	..	..
(2) Generative ..	17·15	0·00	35·6	—	..	..	18·4	..
Locomotion ..	15·18	0·02	11·0	0·03	4·2	..	..	..
Connective tissue ..	17·18	0·00	30·6	—	..	..	13·4	..
Skin ..	29·65	—	53·4	—	..	..	23·8	..
No appreciable disease ..	2·38	—	2·5	—	..	..	..	..

NOTES.—(1) Includes diarrhœa in both groups; (2) includes venereal sore in both groups.

The ratios for the War period are "corrected" as before.

0·00 under mortality shows that some deaths occurred, but below 1 per 100,000; a dash, that no deaths occurred.

## THE ROUTINE EXAMINATION OF INDIAN WATER SUPPLIES.<sup>1</sup>

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THE following notes are intended for the consideration and guidance of sanitary officers and others engaged in the examination of water supplies in India. In no sense are they to be interpreted as precluding the adoption of alternative methods or the development of initiative on other lines:—

Three principles appear to be of fundamental importance; these are: (1) That it is desirable for the collection of information regarding Indian waters, that systematic observations should be made of local waters extending over a series of seasons for the establishment of local standards, and that the results should be comparable as far as possible. Further, as will be referred to later, bearing in mind the apparent intimate relation and concurrent concordance between the flora of human and animal fæces and the flora of natural waters in India, it is desirable that similar observations be made as to the seasonal variation of the faecal flora in both man and animals in that country. (2) That the routine examination of water supplies should be so planned as to give the best data for forming a sound opinion as to their quality and sanitary significance. (3) That in the interpretation of these results, the standards of purity in common use amongst sanitarians in England or Europe are not suitable to the conditions which prevail in India. It is unnecessary to argue this point in detail, but it may suffice to observe that it is common knowledge that most of the waters in daily use by the people of India are quite unsuitable, according to European standards, and yet the morbidity results are not in proportion to the conditions at all times.

The practical point, then, which we have to face is: What routine methods offer the best and simplest means of arriving at a reliable conclusion as to the quality of a given water, and where are we to draw the line that a water is to be condemned as unsuitable for human consumption? The routine methods for the sanitary examination of a water are well known, and resolve themselves into: (1) A personal inspection of the source and its surroundings; (2) a physical and chemical examination; (3) a biological examination. There are difficulties associated with each of these, and their relative importance is not always to be expressed

<sup>1</sup> This paper has been published as memorandum No. 4555, Army Headquarters, India.

by any hard and fast rule. It is desirable that each class of observation be discussed.

**Personal Inspection of the Source and its Surroundings.**—Circumstances are conceivable when this is the only means of forming an opinion as to the suitability or unsuitability of a water supply; and where the conditions are extreme for good or evil, a personal inspection affords quite a simple solution of the question of quality. This is, however, the exception and not the rule. Under ordinary circumstances, it is incumbent upon the reporting officer to make a personal inspection of the source of a water supply, and this procedure should invariably be carried out where possible. The points to be noted and the fallacies associated therewith are sufficiently familiar to call for no review in this memorandum. Neither need any detailed allusion be made as to methods of collection of samples, and their prompt despatch and examination. These are all clearly laid down in official regulations, and in every text-book. It will suffice to emphasise the need of the closest adherence to accepted and well-known rules in respect of these methods.

**The Physical and Chemical Examination of a Sample.**—The interpretation and value to be attached to the former are simple and obvious, but the difficulties are greater as regards the chemical analysis. Modern developments have necessitated a reconsideration of the value to be placed upon a mere chemical examination of a water sample as evidence for or against its potability. There are those who would omit the procedure altogether. We are not yet in a position to accept this extreme policy, but we must recognise the limitations of a chemical examination. On the other hand, the comparative celerity with which certain reactions can be obtained makes the chemical examination an asset which we cannot discard. In England, the indications given by this procedure are only relative, even when judged by reference to local standards; in India, the position is still weaker, owing to the absence of local standards. Therefore, it is necessary for each sanitary officer in India to obtain local standards for his district, and to record them for the guidance of those who may follow him. These standards should be tabulated by months, and refer to such items as chlorine as chlorides, free ammonia, albuminoid ammonia, nitrous nitrogen, and nitric nitrogen. If possible, the fixed and removable hardness should also be recorded. It will be helpful for others who may come after, if these standards are recorded, not only as to quantitative figures, but also as to qualitative reactions. A little trouble

and ingenuity should evolve a colour scheme for ready reference by which the qualitative reactions can be checked. It is hoped that this idea may be developed.

It is recognised that the conditions under which sanitary officers work in India are very different from those prevailing in well-equipped laboratories at home, but making all allowances for these disabilities, it is open to all to advance on these lines and to display initiative in a field where it has hitherto been wanting.

As regards the routine examination of water, it is hoped that when time and circumstances permit, the qualitative and quantitative chemical examination will not be omitted. In some cases, only the former may be possible. The minimum examination should embrace qualitatively the reactions of chlorides, lime, ammonia, nitrites, and nitrates; quantitatively, it should include chlorine, free ammonia, and the nitrogen as nitrites and nitrates respectively. When time permits, the albuminoid ammonia and the organic nitrogen by Kjeldahl's method should also be estimated. In these matters, there is no wish to lay down hard and fast rules: the difficulties are fully appreciated, and the necessity for particular estimations in each case must be judged on its merits by the responsible officer.

The question arises at this stage, are we in a position to lay down any standards by which to interpret the chemical results? In the absence of local standards, hardly so. Once more, it is necessary to lay stress upon the need of the formulation locally of seasonal fluctuation figures. The standards in current use in England and given in all text-books are quite unsuitable for India. To adopt them we should have to condemn 90 per cent. of Indian waters. On this question, it is only safe at present to point out that, chemically speaking, the best waters in India are the upland surface waters as met with in the hill stations. The well and spring waters are, with few exceptions, hard and contain large quantities of oxidised nitrogen salts. The river waters and other surface supplies vary much in the quantities of their saline constituents, but all yield high figures, while the ammonias in them are invariably excessive, if judged by English standards.

Attention may be called to the curious rarity of nitrates in most surface waters in India, while there are usually large quantities of these in the subsoil waters. The explanation may lie in the fact that the nitrifying organisms do not survive the heat and desiccating action of the Indian sun. In general terms, it may be laid down that ordinarily recognised figures for a permissible

limit for free and albuminoid ammonia in England are much too severe for surface waters in India. In other words, the home limits of 0.005 and 0.01 parts per 100,000 of free and albuminoid ammonia respectively may well be represented in India, for an all-round working basis, by double the amounts. The English figures are, however, applicable to Indian subsoil waters. These spring and subsoil waters are very difficult to appraise, as not infrequently they give a satisfactory chemical analysis when judged by English standards, but bacteriologically they commonly work out as being much inferior to the surface waters. This again emphasises the danger in relying upon a chemical analysis only for a water sample in India. A polluted well might conceivably be passed chemically, when a well-sunned surface water might be condemned on its ammonia figures alone. The chlorine standards accepted at home are even more unreliable for India than are the figures for the ammonias and the nitrates. Local seasonal standards are the only safe guide, especially in places liable to heavy falls of rain.

**The Biological Examination.**—The importance of this becomes increasingly manifest, but we have much to learn yet as to the fauna and flora of Indian waters. The biological examination of a water sample should never be omitted, if possible, as it affords the essential complement to all other methods. This examination might well be made to embrace a microscopic scrutiny of the sediment, or a recognition of the grosser microscopic forms to be found in many waters, together with a search for and examination of the bacterial contents of the sample. A regrettable feature of modern times is the neglect of the former class of observation; it is desirable that the routine biological examination of a water sample be widened and not confined to mere bacteriological methods. It is hoped that the sanitary officers in India will accept this view as being not inconsistent with the prosecution of the more tedious and elaborate technique associated with the bacteriology of water, and in respect of which it is necessary to make some detailed remarks.

That much good work has been and is now being done in the bacteriological examination of local waters by sanitary officers in India is fully recognised, but the doubt arises whether the methods they employ and the standards they adopt are the best suited to the conditions and requirements of the country. As in the case of the chemical examination, so too in the bacteriological, we need to depart from accepted European standards and if possible get

workers to adopt uniform methods. It is obvious that if this common line of action be attained, the interpretations of the results will gradually be placed on a sounder scientific basis and be more comparable. The difficulty is to find a method of work which will best meet the end in view. With some reluctance we put forward suggestions, but essentially with the proviso that they are to be taken as suggestions only and in no sense to be regarded as precluding initiative action on other lines.

The most useful procedure appears to be that every water sample be submitted to the three following bacteriological analyses: These are (1) a count of total colonies in 1 cc. of the water; (2) a test in milk for *Sporogenes enteritidis* in not less than 20 cc. of the water; and (3) the inoculation of a series of tubes of bile-salt broth with various quantities of water, using a modification of Thresh's adaptation of MacConkey's method.<sup>1</sup>

*The total colony count*, under Indian conditions, is best made on agar. As with all media employed, too much stress cannot be laid on the need of each batch being of the same reaction and strength. Thus, Lemco  $\frac{1}{2}$  per cent., Witte's peptone 1 per cent., agar 2 per cent., constitutes an excellent nutrient medium, and standardised to an acidity of + 10 to phenolphthalein. The actual amount of water run into the tubes of melted agar is left to the discretion of the observer, but the total count must be expressed for 1 cc. This is not an ideal method, but is capable of use in both hot and cold weather, and if each batch of agar be the same, and all plates be incubated at 37° C. for forty-eight hours before the count be made, the results will be comparable within reasonable limits.

*The sporogenes test* is well known and calls for no detailed reference.

*The bile-salt test* can be most usefully applied if a lactose broth be employed. It has the advantage of confining attention to only one group of faecal organisms—namely, the lactose fractors. In this note there is no need to go into details as to the method, it will be found in the references already given in the footnote. It may suffice to recapitulate the precise composition of the stock medium, which is, peptone 60 grammes, sodium taurocholate 15 grammes, lactose 15 grammes, water 1 litre, with 10 cc. of a

<sup>1</sup> See "Theory and Practice of Hygiene," third edition. J. and A. Churchill. London, 1908, p. 107; also the "Thompson-Yates Laboratories Reports," 1900-01, and *Journal of Hygiene*, July, 1905.

5 per cent. solution of neutral red added, and the whole neutralised with normal sodium carbonate solution till neutral point is reached as indicated by the neutral red. This stock solution is conveniently marked A, while two parts of this, with one of water, will constitute B solution; one part of A, with one part of water, will be C; and one part of A, with two parts of water, will be D.

In circumstances where the saving of media is of importance, an alternative method may be adopted of taking twelve tubes, each of which contains 5 cc. of the stock or A bile-salt solution, and to each of four of these tubes add, respectively, 5, 1, and 0.1 cc. of the water under examination; then, if three out of four in each group show acid and gas formation, faecal bacilli may be considered as present in that group. It is, of course, assumed that fermentation tubes are placed in each test-tube in the usual way, and that incubation is conducted for eighteen hours at 42° C., or, in circumstances of urgency, at 37° C. The next stage is the isolation of the various bacilli that have given the reaction in the bile-salt broth, and their identification by subculture in certain sugars. For this purpose it is better to take a tube which has been inoculated with a large quantity of the water. This subculturing from the parent broth should be done in the following way: Transfer a loopful of the broth from the selected bile-salt tube into 10 cc. of sterile water, shake, then with the same loop transfer a loopful of this water to the second tube, containing 10 cc. of sterile water, and similarly from the second to a third tube. From the second and third water tubes respectively, a loopful may be now taken and spread or ringed on to the surface of plates previously made ready, of solid medium. This medium is conveniently made of peptone 20 grammes, sodium taurocholate 5 grammes, lactose 10 grammes, agar 20 grammes, and 1 litre of water; 10 cc. of a 5 per cent. neutral red solution being added, and the whole neutralised as in the case of the bile-salt broth.

After incubation at 42° C. for twenty-four to thirty-six hours, from ten to twenty colonies will usually be found on the plate from the third water tube, and from 50 to 150 on that from the second tube. The colonies will vary in appearance, some being bright red, others red with a pale border, and some even white, yellow, or transparent. These naked-eye appearances are of little or no value as means of identification; individual colonies must be picked off, and further subcultured and examined as to their motility in a hanging drop, their behaviour in various sugars, the production or not of indol, and their response to the Voges-Proskauer reaction.

The sugars which appear to be the most useful are adonit, dulcit, inulin, and saccharose. These should be made up with sugar-free peptone, bile-salt, and neutral red in accordance with the following formula: peptone 10 grammes, bile-salt 5 grammes, the particular sugar 5 grammes, water 1 litre, with 5 cc. of a 5 per cent. solution of neutral red. Each test-tube containing these sugars must contain a small fermentation tube, and the reaction may be considered to have taken place if acid and gas are developed; the gas production is often scanty. Each kind of sugar tube must be separately marked, and after inoculation incubated at 42° C. for forty-eight hours.

For the indol test it will be advisable to employ a mixture of the persulphate of potash and para-diethyl-amido-benzaldehyd. The reaction by this reagent is far sharper and more exact than that given by the older acid method.

The Voges-Proskauer reaction is obtained by growth in a medium consisting of peptone 10 grammes, glucose 5 grammes, water 1 litre. It is carried out in a fermentation tube, as in the case of the other sugars, but without any neutral red. The reaction is the slow production of a rose-red colour in the closed end of the fermentation tube, after incubating for forty-eight hours, on the addition of a few drops of a concentrated solution of caustic potash. The reaction may not show for quite two hours. This reaction in respect of fæcal bacteria would seem to be much neglected by routine workers in India. There is reason to think that it will afford a valuable means of differential diagnosis of bacteria, and stress is here laid upon its importance.<sup>1</sup> We know very little as yet of the range of organisms found in Indian waters, but the reaction is known to be characteristic of the proteus group, and also to be given by *Bacillus lactis aerogenes*, *B. cloacæ*, and *B. oxytossus perniciossus*.

The quantity of medium to be placed in each sugar fermentation tube will vary with the size of the test-tubes employed, but sufficient must be provided to cover the closed end of the small inner tube. If small test-tubes are in use, probably 5 cc. will suffice.

The foregoing may be accepted as the outline of a method which it appears desirable for the various sanitary officers and others engaged in the routine examinations of waters in India to

<sup>1</sup> See "Theory and Practice of Hygiene," third edition, 1908, p. 111, also *Journal of Hygiene*, vol. v., p. 383.

adopt. Obvious technical details have not been mentioned; these are assumed to be common knowledge. Further, it is not intended by this note that the views or suggestions as to method should be rigidly adhered to; the object is to secure systematic work on certain lines all over the country, so that we may gradually ascertain facts in regard to the fauna and flora of Indian waters, and ensure the best means of forming an opinion as to their sanitary significance. If workers in this field are not prepared to accept or see their way to follow the method suggested as a routine procedure, it is hoped that at least some part of their work may be carried out on these lines.

The primary problem before us being the study of micro-organisms found in clean and contaminated waters in India, it follows that we, at first, may have some difficulty in attaching a correct sanitary significance to their presence or absence. This difficulty is intimately associated with our conceptions as to how far, in the present state of our knowledge, we are justified in taking any one micro-organism or a group of micro-organisms as a bacteriological standard of impurity or purity, and on what principle we can attempt to classify such micro-organism when found in waters. We are here confronted with precisely the same question as in the case of the chemical examination; namely, can we lay down a bacteriological standard for drinking waters in India? In so attempting to lay down a standard, can we accept the European principle and practice of regarding the *B. coli communis* as the true or most workable index of bacterial purity or impurity? This is a question which we know has excited much debate and doubt in the minds of sanitary officers and others in this country. It may be of use to review the situation briefly.

One of the first questions to be settled is, what is to be our attitude towards the *B. coli* as a possible standard or index of pollution? The reply to this is dependent largely upon what we understand as being a *B. coli communis*. The answers are so varied that it may be said that the term does not possess the same significance when used by different workers. There is no necessity, in this article, to go into details as to the facts concerning which observers differ, other than to say that the general position taken up by many English bacteriologists, of applying the term *B. coli* in an elastic sense to include a group of micro-organisms of ill-defined varieties, is in my opinion unsound. The view I favour, and which I have consistently followed, is to apply the term *B. coli communis* to Escherich's organism only,

and this is the attitude I would wish to see taken up by all workers in India. In addition to its classical features of being a non-sporing, motile bacillus, Gram-negative, and growing characteristically on gelatine without any liquefaction, the *B. coli* of Escherich ferments glucose, lactose, dulcitol, but does not ferment saccharose, adonitol, or inulin, nor give the Voges-Proskauer reaction in glucose. It further gives the indol reaction and clots milk with formation of acid. Such is the true *B. coli communis* as I think it should be understood, and bacilli which differ from that organism should be regarded as different species, to which different names or numbers need to be applied. Further, it must be borne in mind that the elastic conception of what is a *B. coli* in current use implies that entirely different species equally represent dangerous faecal contamination. This I cannot admit, as it assumes these different species to be equally resistant to storage or such natural forces as the action of sunlight—factors which materially influence the viability and the significance of the presence of some notable varieties of the group. Moreover, if we look at it from the purely Indian point of view, micro-organisms, which fall within the elastic definition of a *B. coli*, as held by many in England, are so common in all Indian waters that to regard their presence alone as indicative of faecal contamination means the wholesale condemnation of drinking waters in constant use.

In this matter, therefore, we need to depart from English standards, and recognise that, while in England or Europe the bulk of the contamination of waters is due to human excrement in the form of sewage from towns, it is otherwise in India, where much of the fouling is from animals other than men. Further, that the true *B. coli communis* of Escherich is by no means so common as many suppose in the faeces of man and other animals in India and, inasmuch as this bacillus is a micro-organism very susceptible to forces of Nature, inimical to bacilli generally, its presence in waters represents actually a recent and dangerous contamination. In the present scanty state of our knowledge regarding Indian waters, we are reluctant to suggest any precise numerical standard for this micro-organism, even when so closely defined as above. Tentatively, the following proposals are advanced. In a good pond, tank, or surface water, there should be no *B. coli* in 20 cc.; if present in 5 cc., such water is suspicious, and if found in 1 cc. or less, it is to be condemned. A good river water should not yield more than one colony of *B. coli* in 10 cc., but if present in excess of 20 per cc., it is suggestive of a bad

river water to point of condemnation. In the case of wells or springs, the working limit for a good water may be placed at no *B. coli* in 15 cc. As isolated standards, these figures may be misleading, their true value can only be estimated when taken in conjunction with the nature of the other or associated micro-organisms in the sample. A more extended series of working standards will be given further on, in which the undue focusing of attention on the *B. coli communis* is avoided.

This brings us to the question of a possible classification of the various lactose fractors, as isolated by the method described. It is true they are not the only group of faecal organisms, but they are undoubtedly one of the most important. For much work in this direction we are indebted to MacConkey, who suggested the division of all lactose-fermenting organisms into the four following groups: I., those which do not ferment either saccharose or dulcitol; II., those which ferment dulcitol but not saccharose; III., those which ferment both dulcitol and saccharose; and IV., those which ferment saccharose but not dulcitol. Of itself, this laboratory classification is of little value, unless we can say that one or other of the groups is characteristic of human or animal excreta, or better still if we can split the groups further into individual species for separate study as to their sanitary significance. MacConkey's work suggests that in England groups I. and II. are more common in human faeces, and groups I. and IV. in animal excrement. Speaking from personal experience, I am inclined to think that those which ferment dulcitol but not saccharose are the more faecal type, but the group is not entirely composed of these objectionable varieties. Does the rule hold good for India? We do not know, beyond that Clemesha's work in Madras is suggestive that it does hold good.<sup>1</sup> On this point we want more investigations, coupled with further work to determine whether the rule applies for all seasons of the year. Clemesha, Aiyar and Mudaliyar hint that the actual flora of both human and animal faeces varies considerably at different times of the year, and that corresponding changes in the bacterial contents of natural Indian waters occur. The importance of knowing exact details as to these

<sup>1</sup> "A Study of the Bacteriology of Drinking Water Supplies in Tropical Climates." Appendix I. to Annual Report of the King Institute, Madras, for 1908. By Major W. W. Clemesha, I.M.S., Assistant Surgeon T. S. Aiyar, and V. G. Mudaliyar, B.A. This is a most valuable report and full of suggestive facts.

seasonal variations in both excrement and water are obvious. Here is a vast field for original work on the part of those engaged in Indian sanitary effort, and clearly of greater practical value than the division of micro-organisms into arbitrary groups.

The last sentence must not be interpreted literally as meaning that we need not or should not arrange water micro-organisms into groups. As practical workers, we must do so; the difficulty is enhanced by the limits of our present knowledge, especially under Indian conditions, as to which micro-organisms are really indicative of faecal pollution, recent or remote.

In any attempt to build up a classification of water organisms our chief reliance must, for the present, be placed upon differential reactions in the sugars, of course taken in conjunction with other cultural features. To this end, therefore, I commend the routine adoption of a tabular statement of the reactions of isolated organisms as shown in such varied media as lactose, saccharose, dulcitol, adonitol, inulin; also as to whether positive or negative in respect of indol and the Voges-Proskauer reactions; similarly as to motility, liquefaction of gelatine and behaviour when stained with Gram. A number of tabular records in respect of well-known organisms on these lines are available for reference in text-books and current technical literature. These need not be reproduced in this place. Unfortunately, there are many gaps in these tables, and Indian workers will meet with organisms which do not conform in their cultural reactions to any of the recorded or well-known species. It is these gaps which we want to fill, and in local work it will be better to index each organism by a number rather than a name. The frequency, seasonal or otherwise, of these various micro-organisms in water and faeces will on routine tabulation serve gradually to build up local records and, as their numbers and accuracy increase, will further be valuable indices as to quality.

As illustrative of the tabular method suggested, the scheme on the next page is given. The serial numbers are arbitrary and as a matter of fact represent the following well-known micro-organisms: 1 is *B. coli communis*, 2 is *B. acidi lactici*, 3 is *B. sulcatus gasiformans*, sometimes called *B. grüenthal*, 4 is *B. vesiculosus*, 5 is *B. schæfferi*, 6 is *B. neapolitanus*, 7 is *B. oxytosis perniciosa*, 8 is *B. cloacæ*, 9 is *B. lactis aerogenes* or *B. capsulatus* of Pfeiffer, and 10 is *B. coscoroba*. Numbers 11 to 20 are unnamed micro-organisms, such as one may find at any time in Indian waters. The list can be extended indefinitely.

564 *Routine Examination of Indian Water Supplies*

Name or number of organism	Motility	Gram-negative	Liquefies gelatine	Lactose	Saccharose	Dulcitol	Alonit	Inulin	Indol	Voges-Proskauer reaction
1	+	+	0	+	0	+	0	0	+	0
2	0	+	0	+	0	+	+	0	0	0
3	+	+	0	+	0	0	0	0	+	0
4	0	+	0	+	0	0	0	0	+	0
5	0	+	0	+	0	+	0	0	+	0
6	0	+	0	+	+	+	0	0	+	0
7	0	+	+	+	+	+	+	+	+	+
8	+	+	+	+	+	0	0	0	0	+
9	0	+	0	+	+	0	+	0	0	+
10	0	+	0	+	+	0	0	0	+	0
11	0	+	0	+	0	0	0	+	0	0
12	0	+	0	+	0	+	0	+	0	0
13	+	+	+	+	+	+	0	+	0	+
14	+	+	+	+	+	+	0	+	0	0
15	+	+	+	+	0	+	0	0	0	0
16	+	+	0	+	0	+	+	0	+	0
17	0	+	0	+	+	+	+	0	0	0
18	+	+	+	+	+	+	0	0	0	+
19	0	+	0	+	+	+	0	0	0	+
20	+	+	0	+	+	0	+	0	+	0

NOTE.—The *plus* sign means a positive and the *zero* sign a negative reaction.

If we are to adopt at once any arbitrary classification as a rough and ready rule for forming an opinion as to quality in India the suggestion put forward by Clemesha, Aiyar and Mudaliyar, as the result of their work in Madras, appears to merit serious consideration. It is based on the idea that water and faecal organisms are endowed with varying powers of resistance to Indian sunlight and storage. On this basis, they would classify the micro-organisms given in the accompanying table in the following way: Nos. 1, 5, 7, 11, 12, 13, 14 and 15, are according to them in Class I., as being slightly resistant to sunlight and storage; Nos. 2, 6, 9, 10, 16, 17 and 20 are more resistant and constitute Class II.; while Class III., or the most resistant and hardy, are represented by Nos. 3, 8, 18, 19. If this be so, we have in this method a valuable clue as to Indian bacterial indices of quality, as a water rich in organisms of Class I. would presumably be more recently contaminated with faecal bacteria than one which contained chiefly members of Class III. or even Class II. It is obvious the lists can be extended and need to be checked under local seasonal conditions, as what may apply to Madras or Coonoor need not apply to Sialkot or Mhow. Attention is called to this suggestion, as it is little known and affords a wide field for further work. We hope that it may be taken up and developed.

No mention has so far been made as to the routine examination of Indian waters for cholera vibrios. It calls for no extended reference, other than that it should invariably be carried out. The technique to be followed is sufficiently well known.

Sufficient has been explained both as to the object of this note and the methods which it outlines to secure facts covering a large area, and as far as possible uniformity of procedure. Its demerits are recognised, and there remains only to summarise, as a tentative scheme, certain bacteriological standards for various kinds of Indian waters which, in the light of personal experience, appear to be justifiable.

*A good well or spring water* should contain no faecal bacilli in 15 cc., while an indifferent or usable water should contain no faecal bacilli in 20 cc. The presumptive evidence of faecal bacilli is drawn from the initial reactions in the lactose bile-salt broth cultures. Further, a good water from these sources should yield a total colony count of under 50 per cubic centimetre.

*Pond, tank, or lake waters* should be condemned if they contain micro-organisms of the Madras Class I. in 1 cc. or less. These are very difficult waters to judge, and much importance must be laid on the result of a critical personal inspection of the surrounding conditions, that is, where there is obvious evidence of fouling from local habitations or the recent occurrence of rain. Incidentally it may be remarked that the presence or absence of *Bacillus lactis aerogenes* is a valuable criterion, and the marked absence or scarcity of this particular micro-organism from waters of this class is to be taken as an indication for condemnation. Where a surface water contains more than five faecal micro-organisms to the cubic centimetre, even if of the more resistant kind as included in the Madras Class III., it must be regarded with suspicion. *A fair or usable pond water* should not yield more than 200 organisms per cubic centimetre on the total count. It should show no lactose fractors in less than 5 cc., while a desirable feature is the considerable presence of *B. lactis aerogenes*. As a rule, the less resistant type of bacteria, as grouped in the Madras Class I., should not be present in less than 15 or 20 cc. On the other hand, a *good pond water* may be taken to be one which contains less than 100 total colonies per cubic centimetre. It should show no lactose fractors in 15 or 20 cc., be rich in *B. lactis aerogenes*, and practically devoid of the Madras Class I. group in 50 cc.

River waters are notoriously variable. A *bad river water* will yield as many as 1,000 colonies on total agar count. The lactose

fractors will be anything from 20 to 100 per cubic centimetre. This class of water should be condemned. A *usable river water* may be taken to be one which gives 200 to 300 colonics on the total agar count per cubic centimetre. The faecal organism should not exceed 2 to the cubic centimetre, and should be mainly of the more resistant varieties, or those in the Madras Classes II. and III. If any of the less resistant type are present or those of Class I., they should not be found in less than 15 cc.

A *good river water* will not contain more than 100 colonies on total count on agar. If faecal organisms are present they should be mainly of the Madras Classes II. and III. Those of Class I. should not be present in less than 50 cc.

In all these cases it is assumed that the presence of cholera vibrios is tantamount to absolute condemnation. The standards are admittedly tentative and more or less empirical. They are advanced merely as a temporary guide to those engaged in this kind of work, and, as more facts are accumulated, may need to be considerably modified or amplified. It will be observed that the dominant note of this memorandum is the assumption that the lactose fractors are the best and most practical clue to faecal pollution. Of course, they are not the only group of faecal micro-organisms, but we can certainly say they are one of the most important; the object in view is to stimulate further work on definite lines to clear up present ambiguities.

## RECRUITING IN THE GERMAN ARMY.

BY CAPTAIN J. A. BALCK.

*Royal Army Medical Corps.*

IN order to appreciate this subject properly we must first briefly consider the German Army system as a whole.

We all know that concurrently with manhood suffrage in political life, manhood service in military life is at the base of German ideas. The theory in fact is, that a man who has political rights should also be prepared to defend those rights. What is perhaps less realised is, that with this general liability to service a comparatively small proportion of men is actually called upon to serve with the colours. In 1906, it was only 26 per cent. of those reaching the military age (20 years) and presenting themselves at the "mustering." Fifty-five per cent. were put back because they were the wage-earners of their families, 16 per cent. were at once transferred to the Reserves, and 3 per cent. were found medically or morally unfit. It is noteworthy that moral unfitness is, in Germany, a distinct bar to service in the Army. No man who has been sentenced to penal servitude is allowed to wear the King's coat, and the difficulties which in the past have, in France, led to the institution of special disciplinary battalions, are thus avoided. It should be added, in justice to France, that the falling birth-rate practically compels her to take every available man, irrespective of character.

TABLE I.--ALLOTMENT OF MEN OF A MILITARY AGE IN 1906.

Total number appearing at the Mustering		
1,145,000		
Put back	Morally or medically unfit	Fit for service with Colours or Reserves
631,000	34,000	480,000
55 per cent.	3 per cent.	42 per cent.
Joined the Colours	Joined Ersatzreserve	Joined Landsturm
278,000	85,000	117,000
26 per cent.	7 per cent.	9 per cent.

What is now, broadly speaking, the organisation of the Army? There is, first of all, a force of somewhat over 600,000 men serving with the Colours. Of this number about two-fifths goes every year to the Reserve. In the Reserve a man remains five years, during

which time he is liable to be called up twice for training for eight weeks at a time. In practice he is usually only called up once. On completion of his time in the Reserve he joins the First Class "Landwehr" for a further five years. During this time he is liable for two trainings of eight to fourteen days each. In practice he is usually called up once. He then joins the Second Class "Landwehr." In it he remains until the completion of his thirty-ninth year, but with no liability to further trainings. This completes his "Dienstpflicht," *i.e.*, his liability for service in any part of the army. From the second class "Landwehr" he is automatically transferred to the "Landsturm," where he remains till the completion of his forty-fifth year, which is the conclusion of his "Wehrpflicht," or obligation to take part in the defence of his country. It will be seen that all the men just mentioned are fully trained soldiers.

Concurrently with this there is formed the "Ersatzreserve," or reserve of recruits from which men can, if necessary, be drawn to fill up vacancies in the ranks of the regular Army or its Reserve. This consists of four classes of men :—

(1) Men fit for service with the Colours but supernumerary to the establishment.

(2) Men fit for service with the Colours but put back as wage-earners *v. supra*.

(3) Men temporarily unfit.

(4) Men unfit for service with troops in the field but fit for garrison duty, or for service without arms.

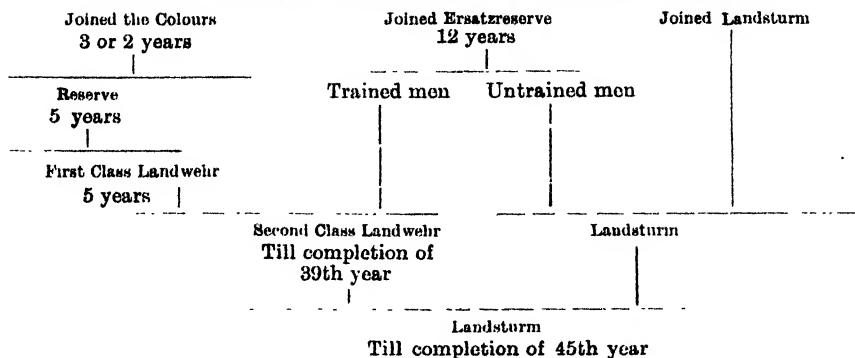
The "Ersatzreserve" is liable for three trainings of ten, six, and four weeks respectively, but for financial reasons only a portion of the men is called out.

Men remain in the "Ersatzreserve" twelve years and then those who have undergone training join the Second Class "Landwehr," the remainder the "Landsturm."

It should be noted that should the supply fall short, men of the first class of the "Ersatzreserve" may be called to the Colours for their first three years in the "Ersatzreserve." Similarly, the circumstances which have entitled Class 2 to exemption may have changed, and Class 3 may become fit. All these possibilities are, however, only for the first three years in the "Ersatzreserve."

Finally, the "Landsturm": This can only be called out if the country is in danger. As will be seen from the above, it consists of fully trained men, partially trained men, and quite untrained men and is therefore, of very unequal value.

TABLE II.—DISPOSAL OF MEN JOINING THE COLOURS OR RESERVES.



We may now discuss the mechanism of this elaborate machine. The German Empire is divided into a certain number of recruiting districts ("Ersatzbezirke"). In February of each year the local authorities hand in to the military authorities a nominal roll of all men who in the current year will reach the military age (20 years). To this is added a list of the men who, in the previous two years have been put back for some reason or other. In March and April a travelling Commission visits all the towns and large villages of the district. Before them appear all the men liable for service. The purpose of this so-called "Musterung" is a preliminary weeding out. An Army Surgeon is attached to the Commission as expert adviser but is not a member of the Board. He examines the men, and as a result the President of the Board allots the men to the following five classes:—

- (a) Men fit for service with the Colours.
- (b) Men temporarily unfit.
- (c) Men not fit for the Colours, but fit for the "Ersatzreserve."
- (d) Men fit only for the "Landsturm."
  - (a) With arms.
  - (b) Without arms.
- (e) Men permanently unfit.

So far for the medical part of the examination. The next thing is to decide on men of Class A who claim exemption as the sole support of their families. Here the medical officer may be called upon to examine the relations of such recruits as to their alleged unfitness for work.

Finally, all men of Class A who have not been exempted, are called upon to draw lots as to the order in which they are liable to be called to the Colours. And here ends the first stage of the proceedings.

The next stage is an Imperial rescript which is published annually on May 1st and which fixes the number of recruits required for the current year from the Empire as a whole, and from each district in particular. Based on this the military authorities of each district call on the requisite number of men to join for further examination at certain specified places. The men first affected are those of Class A of the current year, and those who drew the lowest numbers at the *Musterung* are first called up. Should the number in Class A of the current year be insufficient, the supernumeraries of Class A of the previous year are called upon, and if necessary those of the year before that, may be summoned. Further back than this, however, the authorities may not go, and any deficiency still remaining will be made up from the supernumeraries of other districts. Of course more men are called up than are actually named in the rescript in order to make good any deficiency in numbers owing to further cases of unfitness being found.

This process is known as the "*Aushebung*." The men are once more examined before a Board, to which a medical officer is attached without being a member. It is, moreover, expressly laid down that the President is not bound by the opinion of a medical adviser.

Those found fit are now allotted to units. They are given leave to return to their homes with orders to join on a certain date, usually about October 1st. A third medical examination then takes place. This is, however, not so much with a view to ascertaining a man's fitness as for the purpose of making an accurate record of his bodily condition on joining.

It is noteworthy that men who claim to be disabled by an ailment of which there is no objective sign, may be placed in the ranks on trial. While thus on trial they are kept under constant medical supervision until a final decision is arrived at.

It will be evident from all this that the German army surgeon has a task to solve very different from that of his English colleague. At the first glance he would seem to have everything in his favour. The supply so far exceeds the demand, that in 1906 the Government could afford to dismiss to their homes, on account of their family circumstances, no less than 631,000 men, or 55 per cent. of all the men coming up for examination. Further, after all the demands of the Army had been satisfied, there were still left 1,900 men, who could not be placed because there was no room for them. Finally, the men who come up for inspection are at least 20 years old, two years older than the average English recruit.

Under these circumstances one would almost expect the German standards to be higher than ours. We will see how far this is the case. As German recruits are 20 and over, I give the British figures for the same ages, and, first of all, those for minimum height:—

	German				British			
Guards .. ..	170	cm.	=	67½ in.	.. ..	68	in.	
Garrison Artillery .. ..	164	„	=	65 „	.. ..	67	„	
Horse and Field Artillery ..	160	„	=	63½ „	.. ..	{	Drivers, 65 in.	
							Gunners, 67 in.	
Heavy Cavalry .. ..	167	„	=	66½ „	{	.. ..	Cavalry of the line, 66 in.	
Light Cavalry .. ..	157	„	=	62½ „				
Infantry .. ..	154	„	=	61 „	.. ..		64	in.

It will be seen that the German figures are throughout lower than ours; it is, however, laid down that at least half of the recruits for the Guards and for the Garrison Artillery are to be not less than 69 inches in height, but this hardly makes up for the difference in the general standard.

The chest measurements are a little difficult to compare, as the German figures are for minimum expansion, the British figures for maximum expansion. To compare them I shall therefore add the range of expansion, which is the same for both armies (2 inches), to the German figures. The German Regulations lay down that the minimum chest measurement should exceed half the man's height in inches, by at least ½ inch to ¾ inch. Comparing infantry only the figures for varying heights would be as follows:—

				German					British
Height 62 in.	..	..	..	33½	}				
" 63 "	..	..	..	34					
" 64 "	..	..	..	34½		..	..	34	
" 65 "	..	..	..	35					
" 66 "	..	..	..	35½	}				
" 67 "	..	..	..	36		..	..	34½	
" 68 "	..	..	..	36½					

Here the German figures are distinctly higher than ours. Taken in combination with the lower figures for height one would almost conclude that the German race was a smaller but sturdier one than ours. This is hardly borne out by facts. There are, however, smaller non-German races in the Empire, and it is possible that the figures were fixed low to allow of their inclusion in the Army. On the other hand, the low English figures for chest measurement do nothing more than allow for the probably underfed condition of the recruit when joining.

In two other questions the German view is distinctly laxer

than ours. Myopia of less than 6·5D is no bar to service in the ranks, and an undescended testicle does not exempt unless it has been giving rise to trouble.

In view of the above facts, a German author's contention that their standard is stricter than any other is not on the whole borne out. While stricter in some things, it is notably less so in others.

One of the duties of the German recruiting medical officer is to detect simulated disease. Theoretically, at any rate, all our men are volunteers, however pressed they may be in fact by material or other reasons. They want to "pass the doctor." In Germany there is at least a percentage who have not that wish. Most of the methods for the detection of malingering which are mentioned are well known. Some, which appear to be ingenious, I have not seen described before.

*To Detect Simulated Blindness in One Eye.*—Hold a stick or wooden stethoscope vertically in front of the eyes at a distance of 4 inches (10 cm.). Tell the recruit to read from a book. If he can manage to do so without difficulty he is using both his eyes.

*To Detect Simulated Weak Sight of both Eyes.*—Make the man read the test types in the ordinary way, and note where he stops. Then replace the types by a mirror and place a set of reversed types alongside him, and tell him to read them again from the mirror. If he reads them just as far as before he is malingering, as reflected in a mirror the types are *double* the distance they were before.

*To Test Hearing in general.*—A normal man should hear and understand whispering at a distance of 20 to 25 metres.

*To Detect Simulated Unilateral Deafness.*—Two precisely similar rubber corks are required, one perforated, one solid. Show the recruit the solid one and tell him you are going to stop up his sound ear with it. At the last minute, however, substitute, without his noticing it, the perforated one, and having placed that in the sound ear proceed to test his hearing by whispering. If he says he cannot hear anything he is almost certainly lying. Take out the perforated cork, show it him, and convince him that he ought to have been able to hear. Repeat the experiment, placing this time, without his knowledge, the solid cork in his ear. If he now avers that he does hear after all, he is hearing with the ear alleged to be deaf.

*Another Method.*—Make two narrow paper funnels. Place one in each ear of the recruit, and ask two persons to speak into them, directing them to use different words. Tell the recruit to repeat

what he has heard. If he repeats only one word spoken into the ear alleged to be deaf he is convicted of fraud.

A somewhat useful method to test the value of a quickened pulse-beat is to take the pulse when the man is standing and immediately after when he is lying down. With a sound heart there should be a difference of at least ten to twelve beats.

The duty of the German surgeon is not finished when he has found a man unfit for service with the Colours. He has next to determine whether the man can serve without arms or in the "Ersatzreserve" or in the "Landsturm." The first two are usually taken together. This opens a wide field of investigation, for which all the usual aids to medical diagnosis are necessary. To give an idea of the prevailing standards, all the following are compatible with service without arms or in the "Ersatzreserve." Marked squint, slight kyphosis, unilateral hernia which can be kept back by a truss, hallux valgus, loss of a finger or toe. For the "Landsturm," men with the following disabilities are passed: Blindness of one eye, deafness less than absolute, otorrhœa, flat feet, myopia of more than 6.5D (provided that in one eye there is visual power of at least one-quarter of the normal), absence or non-descent of both testes, goitre, compensated heart disease, loss of the trigger finger, double hernia if it can be kept back by a truss, considerable deformities of hands or feet.

It will thus be seen that the meshes of the German Army net are extremely fine, and but few men escape it for physical reasons. (In 1906 less than 3 per cent.) It is, in fact, carrying to its logical conclusion the principle that with the rights of citizenship go the duties of defending the country. If a man's body prevents him from giving much, he must give what he can. There is work to be done in the garrison at home as well as in the army at the front, and the man who cannot march or shoot can yet set free for his proper work the man who can do both.

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## NOTES ON SANITATION IN THE FIELD IN INDIA.

BY LIEUTENANT-COLONEL R. M. BETHUEN.

*Commandant 101st Grenadiers (Indian Army).*

THE question of sanitation is receiving much attention in the Army nowadays, both in quarters and in the field. As I have taken a considerable amount of trouble in the matter, and have met with some success, I am reporting my experience, in case it may be of interest to others.

To make progress in sanitation, commanding officers must take the matter up by having it thoroughly inculcated into their men, and by insisting on its being practised in peace and on manœuvres, otherwise good results cannot be expected.

In reading these notes, it must be borne in mind that they apply to a battalion of Indian infantry, but there is no reason why the methods referred to therein could not, by modification, be made equally applicable to British troops.

*Disposal of Excreta.*—In the old days, on manœuvres, in camp, &c., the latrines consisted of a long trench varying from 1 to 3 feet wide, and of any depth. Men eased themselves in these trenches, which soon became both disgusting and offensive, no attempt being made to cover up the excreta at once or to provide privacy.

Is it to be wondered at, then, that men preferred going out into the "country" instead of repairing to the latrines? The danger of this system was never considered at that time, hence sickness.

It struck me some years ago that considerable improvement was possible, and I set-to to effect this. What was required was (1) cleanliness in the latrines, and (2) privacy. I started the following method :—

Pans were provided at the rate of 5 per cent. of the strength of a regiment, plus 1 per company for Indian officers, or a total of 48. These are made of  $\frac{1}{8}$  inch of sheet iron, the tops being lined with wire to make them more serviceable. They are made up in nests of six, fitting one into the other, the largest being approximately 9 inches by 1 foot 2 inches by 5 inches. Two sets of nests fit into a large box, with a cover, which can be used as a receptacle. Four receptacles are required for a regiment, that is, one per double company. These receptacles make a good compact load, suitable for transport on a mule.

The receptacles have two uses :—

(1) To hold excreta till incinerators are working.

(2) To hold water, mixed with kerosine oil, for the purpose of cleansing pans after use.

The oil prevents flies from settling in the pans, thereby reducing the chance of spreading infection. Further, a certain amount of kerosine adheres to the excreta, thereby assisting incineration.

Small gunny screens, some 2 feet high by 15 feet long, are provided. These are divided up into five compartments, approximately 3 feet square. In each of these a pit is dug sufficiently large to just hold a pan. Care should be taken not to make them too large, as there is a danger of the excreta lodging between the pan and the pit. Where the ground is soft, or otherwise unsuitable, the pits should be plastered with mud to enable the pans to fit properly. This must be attended to or failure may result. One screen per company is provided—that is, eight per regiment. If these are pitched one behind the other, facing the least exposed front, privacy is practically arranged for. Extra screens, in groups of two, with the front partially closed in, are provided for Indian officers.

Cleanliness is arranged for by having sweepers on duty all day at the latrines. In the morning, when there is a rush, it may be necessary to employ all the sweepers; during the rest of the day, they are told off in reliefs. The duty of these men is to immediately remove and clean a pan, by passing it through the water diluted by kerosine, after use, and then to replace it for the next person. If the incinerator is working, the excreta are emptied into it, if not, into a receptacle. Great vigilance will be required to see that these orders are strictly observed. If this is done, the latrines are kept clean and there is no excuse for men going out into the "country."

A separate screen, behind the latrines, is provided for men to perform their ablutions. This prevents a lot of water being thrown into the incinerators.

The method has been practically tested with mud incinerators, both at manœuvres, on infantry tests, in camp, &c., and has met with marked success.

A native infantry regiment proceeds on service 735 strong, plus 97 public and private followers, or a grand total of 832. I am of opinion that the accommodation provided under the above system would be sufficient for all practical purposes, casualties soon occurring to reduce numbers.

Kerosine oil is carried in tin cans, which are made to fit into the smallest pan of the nest. A can holding about two or

three bottles of oil would appear large enough. This, however, requires a further trial. Oil is not absolutely necessary, but the danger from flies is so obvious that I consider that it should always be used, and I should never neglect doing so myself whenever possible. It can invariably be obtained, on service, from the Supply and Transport, and the small extra expense incurred is outweighed by its undoubted advantages.

Screens are luxuries, but should always be taken when possible. They should always be carried for Indian officers. When transport is short the number of pans for them can be reduced from eight to four, and the screens from four to two. At night, a lamp should be placed at the latrines.

I have been experimenting with portable incinerators, and have designed one which, I hope, will answer the purpose. In designing this incinerator the following points have been kept in view :—

- (1) It must be portable.
- (2) It must be strong and not liable to damage.
- (3) It must not be too heavy.
- (4) It must be capable of lasting some time.
- (5) It must not be too expensive.
- (6) It must burn well and be sufficient for a regiment.

This one, named the "Grenadier pattern," answers these conditions, but requires an extended trial in the field. It has been tried in cantonments, when with 100 lb. of dry grass the stools of 775 men were incinerated in twenty-four hours. This was during the monsoon when the weather was unfavourable and conditions not good. A photograph, with this article, shows the appearance of the incinerator. It is 2 feet square at bottom and  $1\frac{1}{2}$  feet at top, being 2 feet high. It is very simple in construction and put together in a minute. It is made in four quarters of  $\frac{1}{8}$ -inch sheet iron, with hinges of  $\frac{3}{8}$ -inch round bar iron. There are eight fire-bars of  $\frac{1}{2}$ -inch round bar iron. The quarters are joined together by three slots and studs. The iron used must be of some consistency, else the heat of the fire will soon burn through it. The incinerator is well ventilated. The openings are very useful, as they assist rapid incineration. If necessary some of the air-holes at the bottom can be closed with stones or mud. The four quarters fold absolutely flat and have no projections; any good armourer can make the incinerator.

In practice I have a hole dug, about 1 foot deep and 1 foot square, over which the incinerator is placed. This not only assists in ventilation but receives the ashes. When the regiment moves

camp the bars are pulled out and the hole filled in, leaving no trace behind.

Before use, if a fire is lit in the hole, and the incinerator and bars are warmed up, so much the better. It is advisable to use a few pounds of wood, whenever procurable, for this purpose, as it repays any trouble and expense. During the cold weather of 1909-10 the receptacles, pans, bars and screens have been used on tests and at manœuvres. They have been carried on transport mules and no objection has been raised. If incineration is impossible and pans are not available, I have my trenches dug in small lengths, say 1 foot by 6 to 9 inches, and from 1 to 2 feet deep. The earth, taken out of these, is pulverized and placed by the side of each. A sweeper is always on duty at the latrines and has orders to immediately cover up the excreta of every man as soon as he has finished. This keeps the latrines clean and inoffensive.

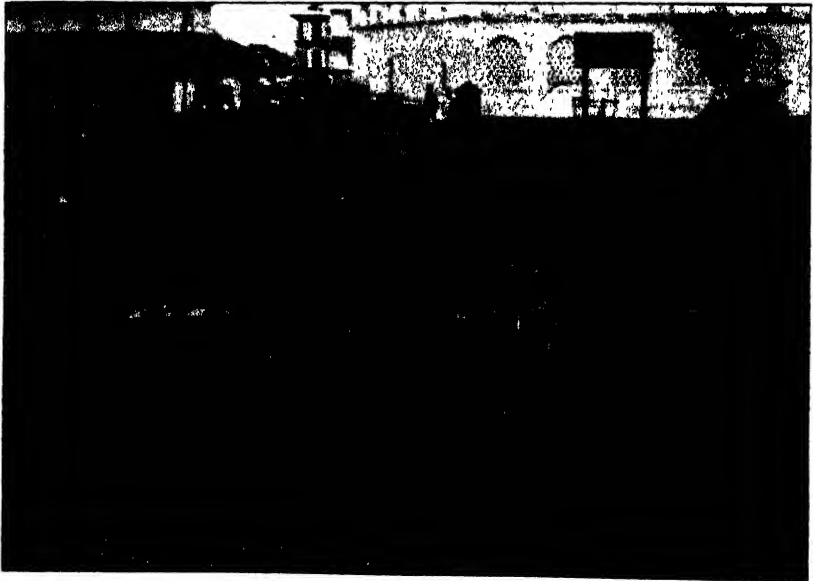
Four photographs accompany this report.



No. 1 shows the screens pitched, with those for Indian officers a little to the right, the incinerator working and the receptacles near by.



No. 2 shows the incinerator, four receptacles, pans, oil-can, and implements.



No. 3 shows the paraphernalia packed ready to load on mules. Starting from the left, the first two packages form the load for No. 1 mule, the next two for the second, and the last two for the third mule.



No. 4 shows the paraphernalia loaded up on mules; that on the right is No. 1, in the centre No. 2, and on the left No. 3, which can, if desirable, be left behind.

The weights of the parts are as follows :—

Incinerator .. .. .	54 lb.
Four receptacles with pans and oil-caus ..	200 lb. or 50 lb. each.
Eight iron bars .. .. .	18 lb.
Implements .. .. .	11 „
Two screens for Indian officers .. .. .	30 „
Screens and pegs for men.. .. .	140 „

The loads are made up as follows :—

ON No. 1 MULE.

Incinerator .. .. .	54 lb.
Two receptacles .. .. .	100 „
Total .. .. .	154 lb.

ON No. 2 MULE.

Two receptacles .. .. .	100 lb.
Eight bars .. .. .	18 „
Implements .. .. .	11 „
Two screens for Indian officers .. .. .	30 „
Total .. .. .	159 lb.

ON No. 3 MULE.

Screens and pegs for men.. .. .	140 lb.
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If three mules are not available, No. 3 can be dispensed with.

On referring to photograph 3 it will be seen how the loads are made up.

The price of the separate parts is :—

							Rs.	a.	p.
Incinerator	..	..	..	..	..	..	12	0	0
Forty-eight pans	..	..	..	..	..	..	35	0	0
Four receptacles	..	..	..	..	..	..	8	0	0
Gunny for screens	..	..	..	..	..	..	6	0	0
Four oil-cans	..	..	..	..	..	..	2	0	0
Poles for screens	..	..	..	..	..	..	1	8	0
Eight bars	..	..	..	..	..	..	2	0	0

The price and weight may be taken as approximate; doubtless they may vary slightly. The price may appear high, but after the experience I have gained I consider it to be money well spent.

*Camp Sanitation.*—Sanitation receives close attention in camp. Kerosine tins are provided for urinals. These are partially filled with sand or earth and some grass, and placed on mounds, raised to a suitable height to prevent soiling the ground. They are placed in close proximity to camp. The grass is burnt and the earth or sand buried and covered up.

In a like manner each company is provided with kerosine tins, into which all sullage water, scraps, bones, tea leaves, &c., are deposited. Men are prohibited from throwing anything of this nature about the camp; the result being that flies are kept down. When tins are not available holes are dug for this purpose, which are filled in daily. This system has been practised in the field and is well understood and appreciated by the men, as it adds materially to their comfort.

Each double company, and not the quartermaster, is made responsible for the cleanliness of its own portion of camp occupied. Before moving a report has to be made by double companies that their portion of the camp is clean. This induces the men to keep the ground as clean as possible.

As regards water, canvas "dighis" have been introduced into the regiment from a pattern obtained from the 45th Sikhs. The great point about these is that water is drawn off by a tube; the mouth is closed, so that men cannot dip their hands or lotas<sup>1</sup> into the water. This reduces chances of infection. These "dighis" are very popular.

The men are now being taught to cover up their excreta on the line of march, about which there should be but little difficulty.

<sup>1</sup> A lota is a small brass or aluminium vessel made to hold water, one of which always forms part of an Indian soldier's kit.

## Clinical and other Notes.

### PRELIMINARY NOTE ON THIRTY-SIX CASES OF SYPHILIS TREATED WITH DIOXY - DIAMIDO - ARSENO - BENZOL ("HATA," OR "606").

BY MAJOR T. W. GIBBARD AND CAPTAIN L. W. HARRISON.  
*Royal Army Medical Corps.*

IN the October number of this Journal Lieutenant-Colonel Birt gave an account of Ehrlich's new remedy for syphilis which must have excited considerable interest and speculation.

The chemical composition of this latest preparation and the results which some other workers have obtained with it have been sufficiently detailed by Lieutenant-Colonel Birt.. We propose to record only our own observations, which are necessarily somewhat incomplete, on account of the short time which has elapsed since we commenced to use the drug, but they have been so striking and so much in accord with those of other observers that they may perhaps serve to supplement Lieutenant-Colonel Birt's paper on the subject.

The new remedy is not yet on the market, but, by the kindness of Professor Ehrlich, we were supplied with a small quantity of "606" in July, and were able to commence using it early in September.

"Hata," or "606," is put up *in vacuo* in glass capsules, the weight of its contents being marked on each capsule. The dose which we have commonly used has been 0.6 gramme, though in some cases, especially the later ones, 0.7 gramme has been given.

At first we prepared the drug for injection as follows:—

For 0.6 gramme "Hata" 30 cc. of sterile distilled water, at a temperature of about 55° C., were placed in a porcelain capsule, which, in its turn, was put in a water bath at about the same temperature, and the yellow powder slowly sprinkled into it with fairly vigorous stirring. To the resulting bright yellow acid solution 6 cc. of normal NaOH solution were slowly added with vigorous stirring. A flocculent precipitate formed which redissolved, and the result was a strongly alkaline brownish-yellow solution. Three drops of 0.5 per cent. alcoholic solution of phenolphthalein were then added, and the solution became deep crimson. Normal acetic acid was then run in till the crimson colour just disappeared (indicating neutrality); while the acid was being added a fine precipitate formed. Finally the capsule contained about 40 cc. of fluid containing a fine yellow salt in suspension, which was injected subcutaneously between the scapulæ, 20 cc. on each side of the spinal column. The resulting tumours were then dispersed by massage.

In later cases we have modified this technique by discontinuing the

use of phenolphthalein in favour of litmus paper as an indicator, reducing the bulk of the injection by using 25 cc. of water in the first place, and injecting the suspended salt under the skin overlying the pectoral muscles. We consider that these slight modifications, especially that regarding the site of the injection which is not pressed upon when the patient is lying in bed, have the advantage of causing less discomfort.

Further investigation will decide whether this is the best form in which to administer "606." Having such a small supply, we judged it best to adhere to the plan which we found fairly satisfactory, without wasting the drug in experiments to discover a better method. It is a disadvantage that the bulk of the injection is so large, but the fluid is more nearly isotonic in its contents of sodium acetate and sodium chloride than when a smaller quantity of water is used.

In addition to the examination for evidence of syphilis, by clinical signs, microscopic examination for *Spirochata pallida* in certain cases, and the test for the Wassermann reaction, the patient, previous to injection, in each case is examined as to the state of his vision, fundus oculi, heart, lungs and kidneys, and his weight is taken. The immediate result of the injection has been some local pain and tenderness, the former being frequently referred to the front of the chest or point of one shoulder, and sometimes accompanied by a sense of constriction of the chest. This pain gave way, in an hour or so, to a rather persistent ache, which appeared in most cases to become aggravated at the end of forty-eight hours, when a reaction, varying in severity with different patients, set in and lasted for about two days. In all the cases, except the one related below, all material discomfort had disappeared in from five to seven days. In one patient, a case of gummatous hepatitis, the reaction was considerably more severe. The whole back became œdematous and there was severe pain, especially in the night, at the site of injection. This reaction lasted for about ten days; it is difficult to account for its exceptional severity, but the patient differed in his circumstances from the others of our series in the fact that he had been allowed a large quantity of fruit daily, and it is possible that at the time of the injection his blood coagulability was abnormally low. Possibly the fact that this patient was suffering from a certain amount of portal obstruction may help to explain the severe œdema.

In another case a faint circinate erythema appeared on the trunk twenty-four hours after the injection; this, however, disappeared by the following day.

The temperature has generally been febrile for four days. The highest temperature recorded was 103.4° F. in our first case. In none of the others did it rise higher than 102.2° F. A curious feature has been the slight increase of fever which occurred in most of our cases between forty-eight and seventy-two hours after the injection, at which period the average temperature was 100.2° F. The majority of our

patients suffered from insomnia for four days; this could not altogether be attributed to the discomfort in the back, since it occurred in some of the cases where there was very little pain.

An injection of morphia  $\frac{1}{4}$  gr. on each of the first three evenings, when required, has been sufficient to mitigate the discomforts immediately attendant on the injection. We have not noted any of the untoward symptoms recorded by some other observers, such as delirium, suppression of urine, and obstinate constipation.

Regarding the effect on the clinical manifestations of the disease, we can only endorse what has been already published as to the marvellous rapidity with which the drug acts. Most of us are aware of the length of time which elapses before a primary sore heals, or an ulcerated mouth and throat are clear of patches, even under vigorous local and general mercurial treatment, so that the following results will give some idea of the effect of "606" in this direction. We may mention that, beyond the use of a simple mouth wash of lead and alum, and a normal saline dressing to primary sores, no other local application was used, except in the case of iritis. Needless to say, no mercury was administered.

In nine cases of primary sore, all treated in the early stage, the chancre had completely healed in an average of eight days, the maximum being fourteen days and the minimum, one day. In each of these cases *S. pallida*, sometimes in great numbers, was demonstrated previously, by microscopic examination; in no case was it possible to demonstrate them, even by dark-ground illumination, forty-eight hours after the injection, and in most of the cases none could be found twenty-four hours subsequent to the injection. In one case where, previously to the injection, the spirochætes were so numerous that thirty-two were counted in a single field, none could be found on carefully searching two slides twenty-four hours after the injection.

In seventeen cases extensive superficial ulceration of the mouth and throat had completely healed in an average of six days, the minimum being three days and the maximum fifteen days, the latter a case in which the throat had healed in eight days, but a deep ulcer at the angle of the mouth took a further week before it was completely covered with epithelium.

In three cases condylomata had completely disappeared in an average of four days, and spirochætes, abundantly present in each case previously, could not be found forty-eight hours after the injection.

In four cases suffering from generalised skin eruption the rash had completely disappeared in an average of seven days. In this connection it is interesting to note that in some of our cases the stains of recent rashes rapidly disappeared completely, or almost completely, after the injection.

The following cases, related in more detail, illustrate the effects of

this remedy when mercury had more or less failed to arrest the course of the disease.

Private H.: Contracted syphilis, April, 1910; received nine injections of mercury, commencing with three of calomel,  $\frac{3}{4}$  gr. each, till July 2nd; commenced second course September 19th; admitted September 28th, after two injections, suffering from ulceration of the tonsils and ulceration between all the toes of both feet, in which numerous *S. pallida* were demonstrated.

September 30th.—Injection of "Hata," 0.6 gramme.

October 1st.—A few spirochætes recovered from ulcers between toes.

October 2nd.—No spirochætes found in two slides examined under dark-ground illumination.

October 4th.—Ulcers between toes healed.

October 6th.—No clinical signs of syphilis.

Wassermann reaction, strongly positive on admission, still positive (October 13th).

Police Constable B.: Contracted syphilis June, 1910; treated with injections of calomel,  $\frac{3}{4}$  gr., and mercurial cream (Hg. gr. i).

July 20.—Syphilitic iritis of left eye, which cleared up with injections of mercurial cream and the usual treatment for iritis; weekly injections of mercurial cream (Hg. gr. i) throughout August.

September 5th.—Severe recurrence of iritis in the left eye; injection of calomel,  $\frac{3}{4}$  gr..

September 7th.—Eye much worse; vision of left eye reduced to hand movements; two large, well-defined, yellowish-red nodules on iris, extending from ciliary to pupillary border, the portions of the iris affected being firmly adherent to the lens, though atropine drops (gr. iv, ad  $\frac{3}{4}$ i) have been used every four hours for two days, and the usual treatment for iritis adopted. Deposits of lymph on the posterior surface of cornea render it impossible to see the fundus oculi. Ciliary congestion not very marked, tension normal, no pain. Vision of right eye  $\frac{6}{12}$ , otherwise normal. Injection of "Hata," 0.6 gramme given.

September 8th.—Slept very little on account of throbbing pain in left eye, which is so severe this morning as to necessitate a hypodermic injection of morphia. Marked circumcorneal congestion; in fact the whole conjunctiva is acutely congested. Tension slightly raised, but not sufficiently to account for the pain. Shortly after the morphia the pain passed away and did not return.

September 9th.—Atropine drops (gr. iv ad  $\frac{3}{4}$ i) resumed three times a day, also hot boric lotion was applied frequently.

September 10th.—Nodules on iris much smaller, and circumcorneal congestion less marked. Counts fingers at a distance of three feet.

September 17th.—Vision, right eye  $\frac{6}{12}$ , left eye  $\frac{2}{6}$ . Nodules on iris scarcely visible except by oblique illumination in dark room.

September 20th.—Vision of left eye  $\frac{5}{8}$ ; synechiæ persist. Atropine drops reduced to once daily; no ciliary congestion.

October 3rd.—Vision of left eye  $\frac{6}{12}$  (under atropine).

October 11th.—Vision, R.  $\frac{6}{12}$ , reads D. 6 at 18 inches; L.  $\frac{6}{12}$  and reads D. 6 at 18 inches.

Wassermann reaction on admission negative to original method, but positive to Stern's modification.

October 11th.—Wasserman reaction negative to original but showed a trace of deviation when tested by Stern's modification.

The very weak reaction to the Wassermann test on admission may possibly be explained by the fact that the recent mercurial treatment of the patient had so strictly localised the spirochaetes that the substances resulting from their activity were not given off into the general circulation in sufficient quantity to determine a positive reaction to the original method, which is less delicate than Stern's modification.

Private M.: Contracted syphilis February, 1909. Treated with injections of mercurial cream and potassium iodide, having had 12 gr. of metallic mercury by injection, the last being given on August 22nd, 1910. Admitted September 8th, 1910, with deep punched-out ulcer with unhealthy oedematous base on extensor surface of right forearm, measuring  $2\frac{1}{4}$  inches by  $1\frac{1}{2}$  inches; three small ulcers near this, and a punched-out ulcer on back of neck, measuring  $1\frac{1}{2}$  inches by  $1\frac{1}{4}$  inches. None of the ulcers show any signs of healing. Arms and legs show many stains and cicatrices of previous ulcers. Superficial ulceration of tongue involving whole of right side, from tip to base. Injection of "Hata" (0.6 gm.).

September 11th.—Ulcer on arm almost level with surface, and shows a healing margin.

September 12th.—The previously ulcerated portion of tongue is now covered with new epithelium, and the ulcers on the neck and forearm show healthy margins with advancing line of new epithelium all round each.

September 18th.—Ulcer on arm now  $1\frac{7}{8} \times 1$  in., that on neck  $\frac{7}{8}$  in.  $\times \frac{1}{2}$  in.

September 30th.—Ulcer on neck practically well; requires no further dressing. That on arm almost healed.

In this case it was obvious that the active process underlying the ulceration ceased within forty-eight hours of the injection, and the later progress was simply that of two large healing ulcers and three trivial ones.

The following notes illustrate the effect of "Hata" in ordinary cases of syphilis:—

Private W.: Admitted August 28th, 1910, with a slightly indurated chancre round the urinary meatus, in which numerous *S. pallida* were found; papular rash on body and arms; mucous patches on both tonsils and behind last molar tooth on right side. Gonorrhœa also present.

September 3rd.—Injection of "Hata" (0.6 gramme).

September 4th.—Rash and mucous patches less marked; no spirochaetes could be found in the sore.

September 7th.—Throat and mouth quite well. Five fading spots on the body were the only evidence of a rash having existed.

September 10th.—Sore healed. No clinical sign of syphilis. No gonorrhœal discharge, and urine shows no mucus or threads. (Has had no irrigations since the injection.)

Wassermann reaction strongly positive on admission.

September 27th.—Wassermann reaction + by original method, still positive to Stern's modification. Further investigation of the serum reaction temporarily stopped, as the case was transferred on discharge to another station, and, owing to some error, the serum was not sent to be tested.

Gunner A.: Admitted September 2nd, 1910, with sore behind the corona in which *S. pallida* found. Generalised maculo-papular rash.

September 5th.—Injection of "Hata," 0·6 gramme.

September 6th.—Rash much fainter.

September 7th.—Rash now discrete, in fact on the arms only faint staining is to be seen.

September 9th.—Very faint staining the only signs of a rash having existed.

September 11th.—Sore healed.

September 12th.—Staining of rash has disappeared. No clinical signs of syphilis.

Wassermann reaction: On admission strongly positive.

September 27th.—Weakly positive to both methods.

October 12th.—Negative to original and to Stern's modification.

Private B.: Admitted September 2nd, 1910, with extensive ulceration of pharynx and tonsils; four condylomata on scrotum, in which numbers of *S. pallida* found, and six similar lesions on inner side of upper third of the left thigh. A few papules on the body.

September 5th.—Injection of "Hata," 0·6 gramme.

September 6th.—Condylomata no longer present, and no spirochætes could be found. Marked improvement in throat.

September 12th.—Throat quite well; no clinical signs of syphilis, and even the stains of a previous rash on his arms have disappeared.

Wassermann reaction, positive on admission, was negative to original and to Stern's modification on October 13th.

Private G.: Admitted October 5th, 1910, with sore on frænum in which *S. pallida* found. Macular rash on abdomen, chest, and legs. Injection of "Hata," 0·6 gramme.

October 6th.—Sore quite healed.

October 8th.—Eruption on limbs very indistinct.

October 9th.—No clinical signs of syphilis.

Wassermann reaction, strongly positive on admission, shows no change at present (October 13th).

As a side-effect of the clinical results above related, the remainder of the patients under treatment in the same ward as these special cases have requested us, at one time and another, to administer the remedy to them

also, notwithstanding the fact that it must have been clear to them that the injection gave rise to some discomfort for a few days.

Regarding the test of these patients' sera for the Wassermann reaction subsequently to the injection, it is impossible, at present, to make any definite statement, as sufficient time has not yet elapsed since many of the cases received the injection. At a future date we hope to publish a more complete report on this part of the investigation, as well as on the occurrence or not of relapses in our cases. Meantime, a study of the subjoined table appears to show that no very great change in the reaction occurs for about two weeks; after that time it seems to become progressively weaker and to die out eventually.

We may mention that the test was conducted in a roughly quantitative manner in the case of the original method, as well as in that of Stern's modification. In the former case, the estimate was made by using the standard amount of complement (equivalent to 0.1 cc.) and also double that quantity, and in the latter, by using two different quantities of extract, one being twice the amount of the other.

TABLE.—ANALYSIS OF RESULTS OF TESTS FOR THE WASSERMANN REACTION AT VARIOUS LENGTHS OF TIME AFTER INJECTION OF "606."

*As Tested by the Original Method.*

Number of weeks after injection	Number of cases originally positive	Number which remained positive	Number in which the reaction became markedly weaker or $\pm$	Number in which reaction became completely negative	Number of cases originally negative or $\pm$	Number of these in which reaction remained or became completely negative	Number in which reaction changed to positive	Test by Stern's method failed from lack of complement in patients' serum
1-2	8	6	0	2	3	2	1*	..
2-3	9	5	2	2	3	2	1*	..
3-4	3	0	2	1	2	2	0	..
4-5	2	1	0	1	1	1	0	..
5-6	2	0	0	2	0	0	0	..

*As Tested by Stern's Modification.*

1-2	10	8	2	0	1	0	1*†	..
2-3	11	7	0	2	1	0	1*†	2
3-4	5	1	2	1	0	0	0	1
4-5	3	2	0	1	0	0	0	..
5-6	2	0	0	2	0	0	0	..

\* These results were given by same patient's serum.

† Reaction very strong.

‡ Reaction very weak.

In this table the column headed "Number of cases in which the reaction became markedly weaker or  $\pm$ " is to be interpreted as follows: "Became markedly weaker" means, in the case of the original method, that the sera deviated the double amount of complement before the injection, but only the standard amount later. In the case of Stern's

modification, that deviation originally occurred with the smaller amount of extract, but that later the tube only in which the larger amount of extract was present showed deviation. "Became  $\pm$ " means that, with the standard amount of complement or the larger amount of extract, according to the method, some hæmolysis occurred in the tube. We are aware that to include these  $\pm$  cases under this heading, and to place similar results obtained before the injection under the heading of "negative," is not strictly fair to the remedy, but it eliminates the only possible question of bias in its favour from the point of view of the Wassermann test.

In one case the reaction, originally negative, became strongly positive a week later, and, again, was found to be considerably weakened after twenty days.

Our observations, which confirm those of other workers, justify us in concluding that in "606" Ehrlich has given to the world a remedy which has a profoundly specific effect in syphilis. The importance to the Army of a drug by which we can reduce the stay in hospital to the extent indicated in the above records, may, in view of the large number of admissions for syphilis, be safely left to the imagination of our readers. If "Hata" justifies its present promise of being capable of effecting a cure with one or, at the most, a few injections, its distinguished elaborator will have conferred a benefit on humanity which has not been equalled since the discovery of antiseptics.

We desire to acknowledge our great indebtedness to Lieut.-Colonel Birt for his invaluable advice and assistance in preparing the first doses for injection; to Major Profeit for the very careful manner in which he has recorded the progress of many of the cases; and to Captain A. D. Jameson for kindly obtaining specimens of blood serum from those cases which were transferred to Aldershot on discharge from hospital.

#### A CASE OF MALIGNANT ENDOCARDITIS TREATED BY "VACCINE"—RECOVERY.

BY CAPTAIN H. A. EMERSON.

*Royal Army Medical Corps.*

WITH A NOTE ON THE BACTERIA PRESENT, BY MAJOR W. S.  
HARRISON.

*Royal Army Medical Corps.*

PRIVATE G. K. was admitted to the Military Hospital, Canterbury, on January 29th, 1910, suffering from tonsillitis. The disease followed a mild course, and there was no suppuration; he was discharged apparently well on February 8th.

On February 17th he was again admitted with symptoms of "gastritis," which were attributed at the time to his having eaten winkles two days previously. The gastritis passed off, but two days after admission

the patient had a rigor, and his temperature rose to 103° F.; at the same time evanescent rashes of an urticarial character developed on the face, limbs, and trunk. These rashes continued to appear for a month. Five or six days after admission the patient began to complain of severe pains over the præcordial region and just above the middle of each clavicle. On examination the heart was found to be markedly dilated, and a systolic murmur was heard over the apex region; this murmur was conducted towards the axilla. Later on, definite systolic and diastolic murmurs became audible along the right border of the sternum, and the pulse was found to be hyper-dicrotic ("water hammer") in character. The temperature, which at the beginning of the illness had risen to 103° F., had by this time come down and now ranged between 100° F. and 102° F.

It was evident that the patient was suffering from malignant endocarditis, and at the suggestion of Major W. S. Harrison a blood culture was made, half a cubic centimetre of warm blood was introduced into each of two tubes of broth and into one tube of sterile distilled water. These were despatched to Major Harrison, and from the broth tubes he grew a pure culture of a streptococcus, from which he prepared a vaccine. This was received on March 22nd, and a dose of five million cocci was administered at once. At this time the patient's condition was as follows: His temperature ranged between 99° F. in the morning and 102° F. in the evening, the pulse was 100 to 120, and was "water hammer" in character; the apex-beat was diffuse, and the cardiac dullness extended to 1½ inches outside the nipple line, well-marked mitral systolic and double aortic murmurs were audible. There was a variable amount of œdema over the sacrum. The patient suffered from severe pain over the præcordium and was extremely ill. Up till this time the treatment had consisted of the administration of cardiac tonics and sodium salicylate; later aspirin had been substituted for the latter drug, and under its influence the evening temperature had fallen to between 99° F. and 100° F., but it had risen again as soon as the aspirin was stopped.

Four days after the first dose of vaccine the temperature fell to normal, the patient felt much better, and a day later the aortic murmurs were no longer audible.

Two further doses (five millions) of the vaccine were given on April 1st and April 11th, and the patient had so far improved that it was not considered necessary to give any more doses, but on April 18th pains again appeared over the præcordium and in the shoulders, while the temperature rose to 99° F.; another dose of vaccine (five millions) was administered. This was followed by a sudden rise of temperature to 103° F., all the symptoms became worse, and the patient appeared to be very ill indeed, but on April 23rd, five days after the commencement of the relapse, the temperature fell to normal, the pain and other symptoms disappeared, and the patient was much better.

From that time on he progressed steadily, and was sent on furlough on June 6th. At the time of his discharge from hospital he was able to perform light ward duties, and to run up and down stairs without distress; the apex-beat was now  $\frac{1}{2}$  inch inside the nipple line, and he still had a definite mitral systolic murmur.

On August 10th he was again examined, and had apparently completely recovered. He was now doing light duty and going through a modified course of gymnastics; no murmur could be heard either at the apex or base of the heart, though the organ appeared to be a little enlarged. He stated that he felt quite well and did not suffer from dyspnoea or cardiac pain.

I desire to thank Lieutenant-Colonel T. du B. Whaite for the use of his notes on the earlier part of the case.

NOTE ON THE BACTERIOLOGICAL EXAMINATION. BY MAJOR W. S.  
HARRISON, R.A.M.C.

The culture tubes received from Captain Emerson on March 18th were placed in the incubator for twenty-four hours, and then subcultured on agar plates; from the two broth tubes there was obtained a pure culture of a small Gram-staining streptococcus growing in short chains of five to six elements; it grew as a fine ground-glass-like film on agar, the individual colonies being very minute and quite transparent. In broth the growth was diffuse; litmus milk was acidulated within twenty-four hours, the milk being clotted and the litmus bleached in all but the upper layers of the medium. Glucose and maltose peptone water were made permanently acid in twenty-four hours, there was no fermentation of lactose, cane sugar, mannite, dulcitol, raffinose, inulin, or salicin. A comparative series of cultures made with a streptococcus isolated from a case of acute rheumatism, and which was kindly given to me by Dr. Beattie, of Sheffield, showed that the reactions of the patient's streptococcus were identical with those of the "streptococcus of acute rheumatism," except that the latter fermented cane sugar after ten days incubation; the patient's microbe also did not show the great vitality on artificial media which is such a marked character of the streptococcus of acute rheumatism. It was much longer lived than most streptococci; I found it alive a month after placing it on agar, but after six weeks I failed to obtain a growth. Another feature of the streptococcus of acute rheumatism which I have not seen mentioned before, is that it will live for more than two weeks in  $\frac{1}{2}$  per cent. carbolic-acid solution, and it will resist heating to 60° C. for half an hour; in this respect the patient's microbe behaved in a similar fashion, it survived immersion in  $\frac{1}{2}$  per cent. carbolic acid for about seven days, and it resisted heating to 60° C. for over half an hour.

The resemblances between the two germs are interesting in view of

the contention of Poynton and Paine, that malignant endocarditis is frequently only a more severe form of the endocarditis of acute rheumatism, and that in these cases it is due to an organism identical with the one which causes acute rheumatism.

### CASE OF MEDITERRANEAN FEVER TREATED WITH VACCINES.

By MAJOR H. V. PRYNNE.

*Royal Army Medical Corps.*

THE patient was the daughter of an officer, who was first seen on October 28th, 1909. The history given was of three weeks' malaise, distaste for exertion, and increasing weakness. Patient was very pale and anæmic and complained of want of appetite and loss of energy. The temperature that evening was 104·6° F. A sample of blood was sent to the Sanitary Officer, Major Fowler, R.A.M.C., who reported a complete reaction to *Micrococcus melitensis*.

With the idea of attacking the germs in the intestine Fermentlactyl tablets were given thrice daily. The temperature came down slightly but rose on November 15th to 101° F. in the morning. To try and secure intestinal asepsis small doses of calomel and pills of thymol were given daily, as this treatment had apparently been successful in the case of an officer recently in hospital with the same disease. This treatment was carried out for over three weeks, when the temperature became normal for nearly a week.

Pyrexia, however, recommenced and it was decided to try the vaccine treatment. A vaccine containing 5 million micrococci to the cubic centimetre was procured, and of this 10 minims, or about 0·5 cc., were given by the mouth every alternate morning. The vaccine was given freely diluted in normal saline, about two to three hours after food. It was preceded by half a tumbler of water, and no food was taken for two hours after the administration. When four doses had been given the temperature became normal, and no rise took place for about seven days. The patient, whose only complaint hitherto had been epigastric discomfort and anorexia, now began to complain of muscular and joint pains. The relapse proved to be a very severe one; she also became extremely depressed and suffered from headache, but there was never any abdominal tenderness. On January 20th Major Fowler kindly saw the case with me, and recommended the further trial of a vaccine.

A vaccine of similar composition was obtained, and given in 10-minim doses on alternate days by the mouth, in the same manner as before: this was commenced on January 22nd, and on February 12th the



temperature became normal, and remained so until February 27th, when the vaccine was discontinued. The muscular pains persisted even after arrival in England in April.

Infection in this case was traced to the ingestion of unboiled milk.

## NOTES ON FIELD HOSPITALS IN INDIA.

BY CAPTAIN G. B. CRISP.

*Royal Army Medical Corps.*

"THE Field Service Manual, Medical," gives exhaustive information on all medical subjects connected with field service; the following notes which may prove of interest to officers coming to India for the first time are taken mainly from it.

Field Hospitals are classified as British Field Hospitals for British troops, and Indian Field Hospitals for native troops.

A field hospital consists of:—

- (1) *Personnel*.
- (2) Medical equipment.
- (3) Supply stores.
- (4) Ordnance stores, including tentage.
- (5) Furniture.
- (6) Ambulance transport.

(1) The *personnel* is enumerated on p. 40 of the Field Service Manual, Medical. The main differences between British and Indian field hospitals are that British have Royal Army Medical Corps officers and assistant surgeons, while Indian have Indian Medical Service officers and hospital assistants; British have British nursing orderlies, while Indian have native ward orderlies; Army Hospital Corps men accompany British but do not accompany Indian (their place in the latter being filled by the hospital establishment of native corps, which on service is detailed for duty with hospitals). Army Bearer Corps men accompany both British and Indian field hospitals.

(2) Medical equipment is enumerated on pp. 79-82 and 92-97 of the manual; it is designed to meet all probable requirements for a period of three months.

Field hospitals can accommodate 100 patients, and each is divided into four sections, A, B, C, D, of twenty-five patients each. These sections are all exactly alike, and each section is divisible into a light and heavy subsection, of which the former may be split off to move with detachments, &c., and is self-supporting for ten to fourteen days. Each section has:—

One pair field medical panniers.

Six medical packages (five light and one heavy).

One medical companion for visual signallers.

Two bed-pans, aluminium (one in canvas case and the other containing a Higginson's syringe).

Two urinals.

One case containing 500 'tabloids' of perchloride of mercury for disinfecting purposes.

One roll of perforated metal for splinting.

(3) Supply stores, p. 58 *et seq.*, include necessities (such as candles, flannel, soap, &c.), disinfectants, stationery, blank forms and books, medical comforts, miscellaneous articles (such as mosquito nets, dusters, lamps, &c.), kitchen utensils, diet requisites, clothing, bedding, petty supplies (such as lamp wicks, kerosine oil), and carpenters' tools.

These stores are also sufficient to meet all probable requirements for three months.

In British field hospitals there are six packages in the light and nine in the heavy sub-section; in Indian field hospitals there are five packages in the light and seven in the heavy sub-section.

There are six paulins and two pakhals in each section of a British field hospital, four paulins and two pakhals in each section of an Indian field hospital. The paulins are for covering stores, two being for covering medical stores, and the remainder for supply stores.

(4) Ordnance stores are enumerated at p. 77, and include axes, flags, buckets, lanterns, mamooties, shovels, &c.

Tentage is enumerated on p. 200, and includes tents for sick, for medical subordinates, orderlies, Army Hospital Corps and Army Bearer Corps, private followers, office, surgery, latrines, guard, stores, &c. No tents are provided for medical officers, those being supplied privately and are of 40 lb. weight according to regulations.

(5) Furniture, p. 65, is a military works supply, and includes office tables, operating tables, stools, portable commodes, chains, and padlocks.

(6) Ambulance transport consists of dandies and tongas, and there are twenty of each to a whole field hospital, five of each to a section.

Field hospitals are slow or fast-moving according to the troops they have to accompany. Slow moving have camel transport normally, while fast-moving have mule transport, but in both cases the medical panniers and the pakhals are carried on mules as first line transport.

The station where the mobilisation equipment and stores are kept is termed the "Equipping Station" and the place where the hospital is completed is termed the "Mobilisation Station."

*Personnel* detailed for duty with medical and corps units will join their units at the station designated for mobilisation.

On receipt of orders for mobilisation by medical units, an officer of each unit will, if possible, be sent to take over the equipment at the equipping station, otherwise it will be sent to the mobilisation station.

The officer detailed for command of a medical unit will place himself in communication with the authorities in charge of the equipment.

Detailed requisitions for obtaining equipment are not required, a written or telegraphic demand quoting the authority being sufficient.

Before granting receipts for stores and equipment, the officer taking them over will satisfy himself as to their fitness for field service. He will, under the orders of the Officer Commanding the Station, store the equipment in a vacant building, or in a portion of the tentage of the unit specially pitched for the purpose, and provided with a special guard.

There are three Indian Army Forms which medical officers should know how to make out, before taking over medical units on mobilisation. These are I. A. F. T. 1705 (weight for which railway transport is required), I. A. F. T. 1725 (weight for which transport is required from the stores to the entraining station), and I. A. F. F. 1054 (Field Service Clothing Indents). Mobilisation orders state that the first two of these should be prepared by the staff officers for medical mobilisation stores of each division, and kept ready along with the actual mobilisation orders.

## A SUGGESTION FOR AN EMERGENCY RATION.

BY CAPTAIN C. RYLEY.

*Royal Army Medical Corps.*

THERE are several axioms which should be adhered to in devising an emergency ration. It should not be too bulky, heavy, or fragile; it must be capable of being kept indefinitely, of being consumed raw, or made up into something hot when cooking is possible, for it should be borne in mind that in modern military operations, cooking will often be impossible. Lastly, it should possess a food value of from 2,000 to 3,000 calories, not merely in the form of a more or less palatable mass, but it should convey the impression of a *meal* to the eye, mind, and stomach.

When the average Briton is compelled to rely on what he can carry in his pocket to suppress the pangs of hunger during a day's excursion, a package of bread and cheese is almost invariably the ration he selects. It is also the form of food that is most general with the class from which the soldier is recruited. I would therefore suggest that these two foods should form the basis of our emergency ration.

Biscuits, 1 lb., must of course be substituted for bread, either the present Army ration biscuit, or, if a more palatable article could be devised, something similar to the biscuit at present in use in the French army, so much the better.

The cheese should be in the form of a small block,  $\frac{1}{4}$  lb. in weight, each  $\frac{1}{4}$ -lb. being separately moulded so as to have a complete covering or rind, and each would be about the size and shape of a large cake of soap. These blocks should then be coated with hard paraffin

wax, to prevent decomposition in the holds of ships and in tropical climates.

Lastly, I would add a 1-ounce tin of desiccated soup powder to each packet of ration, the idea being that the soldier would make his dinner off biscuits and cheese, leaving for his supper the soup, stiffened with the remainder of his biscuits, provided cooking were possible.

The cheese, biscuits, and soup would then be placed in a cardboard box and wrapped in wax paper to keep out the damp. The dimensions would be 6"  $\times$  4"  $\times$  2½", the total weight 1½ lb.

This ration would consist roughly of—

Protein	...	...	135 grammes
Fat	...	...	72    ,,
Carbohydrate	...	...	350    ,,

giving a food of nearly 2,700 calories.

There are many adjuncts with which one is tempted to amplify this rather Spartan fare, such as brick tea, raisins, or chocolate, but it is of importance to make the contents of the package as simple as possible. Moreover, if any proprietary article, the manufacture of which is in the hands of any one firm, were introduced, the supply would be liable to break down in the event of mobilisation.

Though some may be inclined to cavil at the size and weight of this suggested parcel, I do not think the man who had to carry it would be one of them, for it is no more possible to concentrate a man's meat with satisfaction to himself, than it is to concentrate his drink.

## SHORT SUMMARY OF THE WORK AT THE "LOUISE MARGARET HOSPITAL," ALDERSHOT, DURING THE YEAR 1909.

By MAJOR S. F. GREEN.  
*Royal Army Medical Corps.*

### I. Number of maternity cases admitted, 415.

Of these, 272 were multiparæ.

143   ,,   primiparæ.

There were 405 vertex presentations	} Total infants, 421 (including the twins and still-births).
13 breech                   ,,	
2 face                   ,,	
1 footling presentation	

There were no deaths among the maternity cases.

### II. Number of cases admitted for general diseases, 524, including :— Women, 235 ; children, 289.

(Total number of admissions during the year, including both maternity and general cases, 939.)

### III. Number of women and children who attended as out-patients

for extraction of teeth, 330. (In nearly all these cases nitrous oxide gas was given.)

IV. Number of major and minor operations performed during the year, 279, of which the following is a list:—

Nature of operation	Number of cases	RESULTS				Remarks
		Successful	Partially successful	Failed	Died	
I. ABDOMINAL OPERATIONS—						
“ A.” CASES OF LAPAROTOMY						
(1) Excision of vermiform appendix (for appendicitis)	8	6	...	...	2	<p>Of the cases that died, one had a perforation caused by an orange-pip, which, at the time of the operation, was found protruding through the perforation. This woman died 5 days after the operation. The other fatal case of peritonitis died 4 days after the operation. Among the successful cases, two of the appendices contained thread-worms. This was the case of a child aged 5½ months (breast-fed). Variety of intussusception, “ileo-cæcal”: about 4 inches of the ileum and cæcum were invaginated. The child had been passing blood from the bowel for 36 hours before being sent to hospital. Operation, January 4th, 1909. She made an excellent recovery, and is now (April, 1910) in perfect health.</p>
(2) Intussusception (reduction of)	1	1	...	...	...	
(3) Melanotic sarcoma (of uterine appendages)	1	..	..	..	1	<p>Right ovary and part of the right broad ligament found to be affected, and there were extensive adhesions to surrounding parts, including intestines and lower end of great omentum.</p> <p>Pathological report on specimen examined: “Mixed sarcoma made up of round-celled growth with characteristic melanotic patches.”</p>
(4) Cholecystostomy ...	1	1	...	...	..	<p>This proved to be a very troublesome operation on account of the depth of fat in the abdominal wall, and owing to the fact that the liver was small and somewhat retracted under the margin of the ribs. Two large stones (each about the size of a medium-sized acorn) and one smaller stone were removed from the cystic duct. The patient made an excellent recovery.</p>

Nature of Operation	Number of cases	RESULTS				Remarks
		Successful	Partially successful	Failed	Died	
(5) Exploratory laparotomy						At the operation it was found that the growth was too far advanced for removal, and there were secondary growths in the liver, so the abdominal wall was closed again, and the wound healed by first intention. The patient left the hospital at her own request none the worse for the operation.
(a) For case of carcinoma of the pancreas	1	1	...	...	...	
(b) For abscess in the left broad ligament	1	...	...		1	Large calcareous masses found in the abscess cavity. Patient died of peritonitis on 3rd day after operation.
(6) Operations for the removal of Fallopian tubes, ovaries, &c. :—						This operation was done for a case of high degree of contracted pelvis. On two previous occasions (in other stations) embryotomy had to be performed, even though labour had been induced as early as possible.
(a) Removal of both Fallopian tubes	1	1	..	..	...	
(b) Ditto ..	1	1	...	...	..	For double pyosalpinx.
(c) Removal of right Fallopian tube and right ovary	1	1	...	...	..	For pyosalpinx on right side involving right ovary.
(d) Removal of right Fallopian tube	1	1	.	..	.	For pyosalpinx on right side.
(e) Removal of left tube and ovary	1	1	...	...	...	For cyst of left ovary and with left salpingitis.
(f) Ditto ...	1	1	..	..	..	For cyst of left ovary with fibriated extremity of Fallopian tube firmly adherent to ovary.
(g) Removal of left Fallopian tube and ovary and right tube	1	1	...	..	...	For left tubo-ovarian cyst and right hydrosalpinx.
(h) Removal of left ovary	1	1	...	...	...	For cysts of ovary (large numbers of cysts in the ovary).
(7) Removal of cyst of right broad ligament	1	1	...	...	..	This cyst was about 3 inches in diameter, and situated at the outer edge and upper margin of right broad ligament, and had caused considerable pain for six years.
(8) New operations for shortening the round ligaments (intra - abdominal method)	2	2	...	...	...	For obstinate and troublesome cases of retroflexion of the uterus.

Nature of operation	Number of cases	RESULTS				Remarks
		Successful	Partially successful	Failed	Died	
(9) Abdominal hysterectomy						<p>In this case there were three large fibroids complicating pregnancy: One about the size of a cricket ball at the fundus, one somewhat smaller in the lower uterine segment and occupying Douglas' pouch, and a third about the size of a walnut at the junction of the neck with the body of the uterus. Induction of labour was first of all performed at the 5th month and hysterectomy was performed 14 days later.</p> <p>A good deal of the body of the uterus was affected. Date of operation, April 19th, 1909. Patient last seen, April 16th, 1910 (that is, <i>one year</i> after operation) in excellent health. In both cases for large fibroids, causing excessive hæmorrhages.</p>
(a) Complete hysterectomy	1	1	...	...	...	
(i.) For fibroids						
(ii.) For cancer of the body of uterus	1	1	..	..	...	<p>Right tube and ovary removed with sac.</p> <p>Ditto.</p> <p>Removal of right Fallopian tube and ovary with sac, and also removal of left Fallopian tube for hæmatosalpinx.</p> <p>In this case, which was an exceedingly interesting one. the ovum, which was about the size of a hen's egg, was found partially detached at the fimbriated extremity of the left Fallopian tube. It was a very pretty specimen, and on opening the ovum, it was found to contain an embryo <math>\frac{3}{4}</math> inch long. This woman had been bleeding for two days before admission to hospital, and on opening the abdomen it was found to contain very large clots and a great deal of blood.</p>
(b) Supravaginal hysterectomy	2	2	..	..	..	
(10) Operations for ectopic gestation						
(a) Ruptured tubal pregnancy right side	1	1	..	..	..	<p>Right tube and ovary removed with sac.</p> <p>Ditto.</p> <p>Removal of right Fallopian tube and ovary with sac, and also removal of left Fallopian tube for hæmatosalpinx.</p> <p>In this case, which was an exceedingly interesting one. the ovum, which was about the size of a hen's egg, was found partially detached at the fimbriated extremity of the left Fallopian tube. It was a very pretty specimen, and on opening the ovum, it was found to contain an embryo <math>\frac{3}{4}</math> inch long. This woman had been bleeding for two days before admission to hospital, and on opening the abdomen it was found to contain very large clots and a great deal of blood.</p>
(b) Ditto ...	1	1	..	...	...	
(c) Ruptured tubal pregnancy right side with hæmatosalpinx on the left side	1	1	..	...	...	
(d) Incomplete tubal abortion	1	1	..	...	...	

Nature of operation	Number of cases	RESULTS				Remarks
		Successful	Partially successful	Failed	Died	
(11) Radical cure for omental hernia in middle line of abdomen	1	1	...	..	...	..
<b>"B." OTHER ABDOMINAL OPERATIONS</b>						
(1) Radical cure for hernia (inguinal)	13	13	..	..	.	..
(2) Tapping of large pelvic abscess	1	1		.	..	Tapped <i>per vaginam</i> , with Martin's pelvic trocar.
(3) Operation for prolapse of rectum	2	2	..	..	.	In each case a "V" shaped portion of mucous membrane at the lower end of rectum was excised.
(4) Nephrolithotomy	2	2	.		.	One of these two cases was most interesting for the following reasons: It was that of a woman who was very ill on admission to hospital, on February 23rd, 1909, <i>not having passed urine for 44 hours before admission</i> . Three months before that, she had had her right kidney removed in Westminster Hospital on account of stone; after which she became quite well until two days before this admission to hospital. From the symptoms on admission it was evident that she had a stone blocking the mouth of the ureter of the remaining kidney. She was immediately operated on. A small stone the size of a pea was found situated about 2 inches down the ureter, and it was removed by a longitudinal incision. The incision in the ureter was closed by fine sutures. The patient made a rapid and good recovery. This most successful case was operated on by Capt. Lowsley, assisted by Capt. Churton, while I was on leave. She is now (April, 1910), 14 months after operation, enjoying good health.
Total abdominal operations	51	47	..	...	4	...

Nature of operation	Number of cases	RESULTS				Remarks
		Successful	Partially successful	Failed	Died	
II. MISCELLANEOUS OPERATIONS						
Radical cure for encysted hydrocele	1	1	...	...	...	..
Circumcision (for phimosis)	62	62	..	...	...	..
Excision of tumours, N.M.N.G.	1	1	...	...	...	...
Removal of cyst ..	1	1	...	...	...	A ganglion of wrist dissected out.
Excision of nevi...	6	6	...	...	...	...
Large cyst of Bartholin's gland (removal of)	2	2	..	...	...	Dissected out in each case.
Ligature and excision of internal piles	3	3	..	...	..	...
Removal of foreign bodies from the tissues	2	1		1	.	The case that failed was unsuccessful after two attempts. It was the case of a woman in whom a needle was deeply buried in the tibia, and firmly fixed. She was afterwards sent to the London hospital to be thoroughly X-rayed, and after great difficulty the needle was extracted by one of the surgeons of that hospital. The other case was one in which a portion of needle was buried deeply between 1st and 2nd phalanx of thumb.
Caries of superior maxilla scraped	1	1	.	...	.	...
Caries of lower jaw scraped	1	1	.	...	..	...
Tubercular caries of both tibia: cavities scraped with Volkman's spoon	1	1		...	..	Both tibiae very much affected. Successful after 4 scrapings and packing with iodoform gauze, and iodoform emulsion.
Erasion of glands ...	10	10	..	..		...
Tubercular glands in neck dissected out	1	1	.	..	...	Large mass of glands.
Erasion of joints...	1	..	.	1	...	Amputation of finger necessary.
Division of plantar fascia for talipes	1	1	.	...	...	...
Excision of supernumerary toes and fingers	2	2	.	...	...	...
Amputation of fingers ...	1	1	...	..	...	...
Breaking down of adhesions (elbow)	1	...	1	...	...	For ankylosis of elbow-joint.
Removal of adenoid vegetations from nasopharynx (by curetting)	23	23	..	...	...	.
Removal of nasal polypus	1	1	...	..	...	...
Removal of tonsils ...	39	39	.	...	...	...
Abscess, floor of mouth (incised and drained)	1	1	..	..	...	...

Nature of operation	Number of cases	Results				Remarks
		Successful	Partially successful	Failed	Died	
Abscess of breast (incised and drained)	7	7	..	..	...	
Submammary abscess (incised and drained)	1	1	...	...	..	.
Abscess of soft palate (incised and drained)	1	1	..	.	..	...
Large abscess beneath cervical fascia (incised and drained)	1	1	.	.	..	...
Wound of soft palate sutured	1	...	..	1	...	This wound, 1½ inches long, was caused by a fall on a dinner knife. Patient brought to hospital on second day after accident. Wound sloughed.
Wiring of fracture ..	1		1	..	..	This was a case of badly comminuted fracture of the elbow involving the joint.
Dilatation of internal os and cervical canal of uterus	3	3	.	...		For dysmenorrhœa.
Repair of ruptured perineum (in all cases rupture extending into the rectum, and of long standing)	3	3		..		One of these three cases was very interesting, as the rupture, extending for 1½ inches up the rectum, was of four years' standing, and had caused the patient much misery and inconvenience, as she was unable at any time to go far from her house. The operation was performed when the woman had completed 3 months of pregnancy. Six months later she was re-admitted into the Louise Margaret hospital at full term, and was delivered of the child without rupture of the new perineum. She has had absolute comfort since the operation was performed.
Large hæmatoma of vulva opened and clots cleaned out	1	1	...	...	..	The hæmatoma and wound of vulva and vagina were the result of falling straddle-legged over the back of a chair.
Closure of recto-vaginal fistula	1	1	...	..	...	...
Curetting of uterus ...	34	34	.	.	...	For subinvolution, endometritis, &c.
Evacuation of uterus ...	6	6	...	...	...	For retained portions of placenta and membranes, missed abortion, carneous mole, &c., &c.

Nature of operation	Number of cases	RESULTS				Remarks
		Successful	Partially successful	Failed	Died	
Induction of premature labour						By introduction of Champetier de Ribes' bag after dilatation with Hawkins' ambulators dilators.
(1) For contracted pelvis	1	1	...	...	...	
(2) For placenta prævia	3	3	...	...	...	
Induction of abortion—						Hysterectomy performed 14 days later. Complicating pregnancy, and threatened uræmia.
(1) On account of fibroids	1	1	...	...	...	
(2) On account of serious albuminuria	1	1	..	...	...	
Total number of operations	279	270	2	3	4	...

## IODINE—ITS USE IN MILITARY WORK.

By LIEUTENANT T. J. MITCHELL.

*Royal Army Medical Corps.*

*Disinfection of the Skin.*—One of the first to recommend Grossich's method of using iodine as a skin disinfectant preparatory to operation was Major F. J. W. Porter.<sup>1</sup> Since then many surgeons have published articles on the same subject, and all draw attention to the satisfactory results obtained.

The methods at present in vogue, while trustworthy, are elaborate, and involve a considerable expenditure of time, labour, and money. It is not my intention to criticise these methods, but rather to emphasise the letter published in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS by Major Porter,<sup>2</sup> in the hope that iodine may find a place in our field equipment.

Strict asepsis is no less important in the field than in our modern and up-to-date operating theatres. The only difference is that in the former case it is more difficult to obtain. Any simple technique is worthy of a prolonged trial in our military hospitals.

It has been discovered that by the use of iodine one can now do away with the preliminary washing, shaving, and preparatory dressing otherwise necessary before an operation. The technique recommended is to paint the operation area with iodine solution.

<sup>1</sup> Porter, *British Medical Journal*, vol. i., 1909.

<sup>2</sup> *Idem*, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, April, 1909.

- (1) One hour before the operation commences.
  - (2) When the patient is on the table.
  - (3) When the operation is completed and the skin sutures are tied.
- (No. 1 can be applied before the patient is anæsthetised.)

The painting of the skin area requires only a few seconds, and does away with a long and troublesome process, sometimes trying to the patient.

The preparation of iodine used is immaterial. Major Porter obtained good results with 10 per cent. iodine in spirit. The majority of surgeons prefer a weaker solution to avoid setting up a dermatitis. Many solutions have been used—iodine 15 grains to chloroform 1 ounce; iodine 5 per cent., ether 5 per cent. dissolved in spirit. Wallace<sup>3</sup> recommends rubbing the skin one hour before operation with an alcohol and acetone solution, and when this has dried a 3 per cent. solution of acetone iodine is painted on. The disadvantage of this method is the pungent irritating odours given off. He now uses dichloride of ethylene and iodine.<sup>4</sup>

The writer's experience has been with the tincture of iodine: The skin area need not be shaved, and no matter how dirty the part is it should on no account be washed previous to the operation. The clefts between the cells of the skin contain fat, sweat, and bacteria; if the skin be washed with soap and water the cells swell up and prevent the iodine penetrating into these clefts. The advantages of adding a fat solvent, such as ether, to the iodine solution are evident. The iodine solution acts by fixing the bacteria, hardening the skin, and causing slight hyperæmia. In from seven to ten days there is a slight desquamation of the skin. The solution can be used on patients of all ages, even on the skin of infants and on that of the very aged. To sum up, the advantages of this method of skin disinfection are:—

- (1) Efficiency, proved by the results published by Porter,<sup>5</sup> 30 cases; Waterhouse,<sup>6</sup> 150 cases; Fenwick,<sup>7</sup> 110 cases; Stretton,<sup>8</sup> 51 cases; König,<sup>9</sup> 251 head injuries; Professor von Eiselsberg,<sup>10</sup> 200 cases.

I have used this method of skin disinfection in twenty-five cases, including operations for varicose veins, varicocele, tumour of female breast, removal of cysts, and severe wounds of the head, and always obtained healing by first intention.

- (2) Ease, quickness, and certainty of application.

<sup>3</sup> Wallace, *Practitioner*, April, 1910.

<sup>4</sup> *Idem*, *British Medical Journal*, vol. i., 1910.

<sup>5</sup> Porter, *British Medical Journal*, vol. i., 1909.

<sup>6</sup> Waterhouse, *Lancet*, April, 1910.

<sup>7</sup> Fenwick, *Lancet*, April, 1910.

<sup>8</sup> Stretton, *British Medical Journal*, vol. i., 1909.

<sup>9</sup> König, *Lancet*, vol. i., 1909.

<sup>10</sup> Goodwin, *British Medical Journal*, vol. i., 1909.

- (3) The area of skin disinfected is mapped out.
- (4) There is no discomfort to the patient.
- (5) Expense is slight.
- (6) The solution of iodine can be used in all emergency operations, and valuable time is not lost.

The operator's hands can be efficiently sterilised by washing them with ethereal or turpentine soap for five minutes, and then placing them for two minutes in a quart of water containing 1 drachm tincture of iodine.<sup>11</sup>

The vagina may be efficiently sterilised for gynæcological operations by plugging it with swabs, soaked in iodine and spirit solution.

Iodine and spirit solution is a very useful dressing in septic wounds and discharging tubercular sinuses.

*Therapeutic Uses.*—An important therapeutic though unknown use to which the tincture of iodine may be put is as an antidote to the caustic action of carbolic acid.<sup>12</sup> Great relief is immediately obtained by soaking any external part injured by carbolic acid in a basin of water to which 1 drachm of tincture of iodine has been added. In the case of internal carbolic acid poisoning,  $\frac{1}{2}$  to 1 drachm of tincture of iodine in half a pint of tepid water should be administered.

*Ligatures and Sutures.*—The use of iodine in the sterilization of catgut was first recommended by Claudius in 1902. Since that year the writings of Salkindsohn, Scott-Riddell,<sup>13</sup> Stewart,<sup>14</sup> Barling,<sup>15</sup> Moschowitz,<sup>16</sup> Dickie,<sup>17</sup> and others, have all shown iodised catgut to be the most efficient and cheapest catgut in use at the present time.

To prepare the catgut all that is necessary is to place the commercial hanks in the following solution for eight days: Iodine 1 part, potassium iodide 1 part, water 100. The catgut before use is washed in a weak carbolic solution, or in normal saline. The bottle or vessel containing the iodide solution should have a well-fitting lid, otherwise the iodine may evaporate. At the end of the eight days the catgut is very dark in colour. Some of the hanks may become brittle and uneven, according to the quality of catgut. Instead of using the watery solution the catgut may be prepared by placing it in a solution of iodine 1 part, spirit 15 parts. When catgut is prepared by this method it may swell up and feel sodden when placed in a weak carbolic solution or normal saline. This defect can be overcome by storing the catgut in a 1 per cent. solution of formalin after it has been prepared in iodine and spirit.

<sup>11</sup> Daimreuther, *Medical Records*, January 16th, 1909.

<sup>12</sup> Maberly, *Lancet*, vol. ii., 1907.

<sup>13</sup> Scott-Riddell, *British Medical Journal*, vol. i., 1907.

<sup>14</sup> Stewart, *British Medical Journal*, vol. ii., 1909.

<sup>15</sup> Barling, *British Medical Journal*, vol. i., 1905.

<sup>16</sup> *Annals of Surgery*, September, 1905.

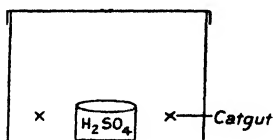
<sup>17</sup> Dickie, *British Medical Journal*, vol. i., 1910.

Catgut prepared in this way will last in the tissues for :—

Number 00	..	..	..	..	Six days.
„	1	..	..	..	Eight days.
„	2	..	..	..	Ten days.

Moschowitz<sup>18</sup> has gone further, and uses iodine-prepared-catgut dry. His method is simple. After eight days in a watery solution of iodine he lifts the hanks with sterilised forceps, and places them in a sterilised glass dish fitted with a cover. In the bottom of this dish is a small beaker containing concentrated sulphuric acid.

The sulphuric acid absorbs the moisture, and in a few days the catgut is dry.



The advantages of handling dry catgut, and the ease with which ligatures can be applied may be imagined, but cannot be fully appreciated until the dry catgut has been used.

After many trials and experiments Moschowitz has come to the following conclusions :—

(1) Dry iodine-prepared-catgut is absolutely sterile, and remains so for years.

(2) It is impossible to infect it by ordinary means.

(3) It does not act as an irritant in the tissues.

(4) The tensile strength of dry iodised catgut is superior to wet.

(5) It is very cheaply prepared.

(6) It is absorbed when it has served its purpose. Silk, silkworm gut and horsehair can all be similarly rendered sterile by means of iodine.

My experience of ligatures prepared by the iodine method extends over some years, and the results have always been satisfactory.



<sup>18</sup> *Annals of Surgery*, September, 1905.

## Lecture.

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### THE GENEVA CONVENTION.<sup>1</sup>

By COLONEL W. G. MACPHERSON, C.M.G.

THE Geneva Convention is an international agreement, adhered to by practically all the civilised States, for the purpose of ameliorating the condition of the sick and wounded in war. The object is essentially humanitarian. The Convention is in fact more a concession to sentiment than a military or other necessity; for the humanitarian principles involved were practised long before it was thought of. Indeed, the fact that these principles have now been reduced to a series of articles in a convention binding upon nations has, in the opinion of many, a tendency to increase rather than to mitigate the horrors of war; because the more lenient war is made, and the more the hands of a commander are tied by international agreements, the more likely is it to become prolonged and to spread broadcast amongst women, children, and other innocent inhabitants of a country, suffering and distress out of all proportion to the suffering and distress to which a fierce, relentless and short war submits the sick and wounded soldiers. The Geneva jurist, M. Moynier, recognised that an opinion existed to the effect that the Geneva Convention might be oppressive and embarrassing without adding to the humanitarian considerations in war, but stated that it was an opinion which existed only amongst the less cultured and less educated military men; but in this, as another writer, Lueder, has stated, he is wrong.<sup>2</sup> It is an opinion held by some of the most humane and thoughtful officers in the armies of all nations.

The idea of making war terrible and relentless in order to make it short, and so cause as little distress as possible to a nation, is a form of humanitarianism which has sprung up in recent years amongst civilised powers. On the other hand the desire to mitigate the sufferings of the sick and wounded is as old as humanity itself. There are numerous historical instances in which this sentiment has taken the form of agreements between opposing commanders. Actual treaties similar in intention to the Geneva Convention were even made. An account of four of these will be found in a document presented by the International Red Cross Committee of Geneva to the Conference, which met to draw up the Geneva Convention of 1864. In 1743 a treaty was concluded on behalf of

<sup>1</sup> Lecture delivered at the Law Schools, Cambridge University, on the invitation of the Whewell Professor of International Law, February 25th, 1910.

<sup>2</sup> Lueder, "La Convention de Genève," Erlangen, 1876, p. 239.

sick and wounded at Aschaffenburg after the Battle of Dettingen. In 1759 a similar treaty was made at Sluys in Holland between France and England. Later on in the same year a treaty, remarkably like it in many respects, was made between Frederick the Great and Louis XV. In 1800 Baron Percy, the principal medical officer of Napoleon's Grand Army, drew up a form of agreement for an International Convention respecting the treatment of sick and wounded, which was approved by his immediate chief, General Moreau, and submitted to the Austrian Commander-in-Chief, General Kray. It consisted of five articles, which may almost be regarded as the framework of the Geneva Convention of 1864. In fact, some of the very words and expression of Percy's proposed Convention are introduced into the latter.

Still more noteworthy is the collection of treaties and agreements made by Gürlt and published in Leipzig in 1873.<sup>1</sup> Gürlt cites no fewer than 291 treaties, having the humanitarian treatment of sick and wounded as their object, which were concluded between belligerents in Europe and America between 1581 and 1864. The German Empire, (that is to say Austria and States of the German Confederation) took part in 103 of these, France in 187, Spain in 49, England in 46, and other Powers in lesser number. It is perhaps curious to note that the period displaying the greatest amount of humanitarian sympathy with the victims of war was the middle of the eighteenth century,<sup>2</sup> the period of Voltaire and Frederick the Great, and that of least sympathy the middle of the nineteenth century.<sup>3</sup> In fact, during the nineteenth century, after the Napoleonic wars and up till the propagation of the sentiments leading to the Geneva Convention of 1864, so little was it known that agreements had over and over again been made between commanders regarding sick and wounded, that when the idea of the Geneva Convention was promulgated it was regarded as something novel and unique in the history of warfare. It was only afterwards that writers like Moynier in Switzerland, Löffler, and, above all, Gürlt, in Germany, began to dig into the history of these agreements and bring them to light.

The events which led directly to the Geneva Convention were connected with the Battle of Solferino, in 1859. The name of Dunant is intimately associated with these events. Although at least two other

<sup>1</sup> *Zur Geschichte der internationalen und freiwilligen Krankenpflege.*

<sup>2</sup> Lueder, *op. cit.*, p. 30.

<sup>3</sup> Probably the most flagrant instance in history of an infringement of the principles of the Geneva Convention occurred in 1858 during the political revolution in Mexico, when the Republic was a scene of desolating warfare. General Marquez celebrated the triumph of his forces by an abominable massacre at Tacubaza, a suburb of Mexico City, in which "the medical attendants, including an English physician, all of whom had voluntarily given their services to the wounded, were taken out and deliberately shot in cold blood."—Enock, "Mexico." F. Unwin. 1909, p. 124.

writers—Palasciano, of Naples, and Arrault, of Paris—raised their voices on behalf of the sick and wounded in war, after the campaign in Italy, earlier than Dunant, the Geneva Convention of 1864 is directly due to the pamphlet, *Un Souvenir de Solferino*, which Dunant wrote at first for private circulation in 1862, but afterwards published in 1863. It created a sensation throughout Europe. Dunant was a private gentleman and witnessed war from the point of view of a humanitarian observer. He had been influenced by reading about Florence Nightingale's work in the Crimean War, and formed the intention of being present at Solferino with a view to emulating her in the war then being waged. Moved by the sentiments, which he himself evoked, he endeavoured with ceaseless energy to realise his ideals, visiting the Courts and War Offices of Europe, with the view of enlisting their sympathies. He was warmly supported by his compatriots, the Swiss General Dufour, the famous jurist Moynier and other members of a Society which existed in Geneva, the *Société Gènevoise d'utilité publique*. Eventually he obtained promises from various States to send delegates to an international conference at Geneva in 1863, to discuss the formation of national volunteer societies for aid to sick and wounded in war. This Conference had no official *status*, but it adopted certain resolutions, upon which the formation of the so-called Red Cross Societies of the present day has been based. Out of the Committee, which inaugurated this Conference, arose the *International Red Cross Committee*, which has ever since been engaged in keeping alive the sentiments which were aroused by Dunant's pamphlet. This Committee issues a monthly *Bulletin de la Croix Rouge*, arranges international Conferences of Red Cross Societies, and endeavours generally to maintain the idea of solidarity amongst them. It is composed of gentlemen of Swiss nationality, but retains its designation of "international" by courtesy and in recognition of the work which it initiated.

The resolutions of the Conference of 1863 were ten in number; they were concerned mainly with the formation of national committees for organising groups of volunteer nurses who should succour wounded on the fields of battle, maintain themselves out of their own resources, act independently, and be distinguished by wearing a white brassard with a red cross. Three additions in the form of *vœux* were made to the formal resolutions, expressing a desire that governments would afford encouragement and protection to the national aid committees, that ambulances, hospitals, and army medical and voluntary aid *personnel* should be made neutral in time of war, and be protected by a distinctive sign and flag.

The International Red Cross Committee, immediately after the Conference of 1863, commenced to work, through the Swiss Federal Government and diplomatic channels, to bring about an official Conference to consider the drafting of a treaty which would be binding on belligerents in time of war. Thanks to the interest taken in the movement by certain royal families and Courts of Europe, notably those of Prussia, Saxony,

and France, the Swiss Federal Government was able to obtain the consent of sixteen of the twenty-five States, to whom invitations had been sent, to meet and draft the convention known as the Geneva Convention of 1864.

Such, briefly, is the history of the events and sentiments which led to this, the first Geneva Convention, for there have been three Geneva Conventions, those of the years 1864, 1868, and 1906, although only the first and last were ratified. The Convention which we are specially interested in to-day is of course the last. But the first is still in force for those powers which adhered to it, but have not yet ratified the Convention of 1906.

Although the idea of the Convention, as has just been pointed out, originated in Dunant's desire to have independent groups of voluntary workers organised for succouring wounded on the field of battle, and the International Conference of 1863, which was the preliminary step towards the Conference which drafted the Convention of 1864, dealt with the formation of national Red Cross Societies for this purpose, the Convention of 1864 purposely omits all mention of voluntary aid on behalf of the sick and wounded. At the opening meeting it was made clear to the delegates that the object of the Convention was to draw up an agreement by which the regular organized medical services of armies would be enabled to carry on their work under the most favourable conditions, and that certain Powers had only consented to take part in the negotiations on the understanding that the Conference would have nothing to do with the resolutions of the International Conference of 1863. This is a dominating feature of the Convention. It is a feature which has been modified under considerable safeguards in the more recent Convention for reasons which will be mentioned later on.

The Convention of 1864 contains ten articles, of which seven only lay down the principles upon which unnecessary suffering may be spared the wounded. Military hospitals and ambulances are declared to be neutral, so long as there are sick and wounded in them. All necessary *personnel* connected with the work of hospitals and ambulances are also considered neutral under the same conditions, and are entitled to rejoin their own army after capture by the enemy. In certain circumstances material of ambulances and property of *personnel* are also restored after capture. Privileges are granted to the inhabitants of a country who aid sick and wounded. Wounded may be sent back to their own army, and other provisions regarding their disposal are introduced. Finally, a distinctive flag and brassard, containing a red cross on a white ground, are adopted as the sign of neutrality for hospitals, ambulances, convoys of sick and wounded, and *personnel*.

The wars of 1866 and 1870-71, which took place before this Convention was fully understood either by the army or the people and when Dunant's sentiments and the International Conference resolutions of 1863

had much greater hold on the public mind, brought the Convention into discredit. It was criticised almost immediately, and many proposals for its revision were put forward by individuals and International Conferences. The mere enumeration of these will explain the extent of this criticism. In 1867 proposals for revision were made at an army medical conference in Berlin, at a meeting of the German National Aid Societies at Würzburg, and at an International Conference of Red Cross Societies in Paris. In 1868, an official Conference at Geneva drafted five articles to be added to the Convention of 1864, and ten applying it to naval warfare. These articles were never ratified by the Powers because a prolonged series of negotiations was commenced in connection with the articles relating to naval warfare, and the Franco-German War broke out before the negotiations were completed. At the International Conference on the Laws of War held in Brussels in 1874, the Russian Government submitted proposals for additions to the Geneva Convention; the Belgian Government, the chief delegate of the German Government, General von Voigts-Rhetz, a sub-committee, and the special committee, appointed to consider the proposals for revision of the Geneva Convention, also drew up proposals of modifications and additions at the same time. In 1876 Professor Lueder, of Erlangen, published a carefully considered proposal in a critical treatise on the Geneva Convention, which was awarded a prize given by the Empress of Germany for the best work on the subject. In 1880 the Institute of International Law at Oxford adopted a series of articles relating to sick and wounded, which covered the whole ground of the Geneva Convention; in 1892, Colonel Ziegler, of the Swiss Army Medical Service, submitted proposals for revision to a conference of Swiss officers at Olten. M. Moynier made similar proposals in 1898, the Hague Conference of 1899 also considered matters relating to the Geneva Convention and its application to naval warfare. An International Conference on aid in time of war held at Paris in 1902 adopted a series of resolutions for the revision of the Convention, and finally a work was published in the same year by M. Gillot, of Paris, on its revision.

This exceptional amount of criticism and proposals for revision was due to the experiences of the war between Prussia and Austria in 1866, and the Franco-German War of 1870-71. In fact, with the exception of our recent campaign in South Africa and the Russo-Japanese War, no other wars of any importance have taken place in which the Geneva Convention has been in force. In any case it is apparent that the Convention of 1864 displayed many defects when it was put to practical test. Briefly, these defects were vagueness, want of definition, and lack of completeness with regard to the military medical units and *personnel* protected by the Convention; the use of the word "neutral," the enormous opportunities for abuse of the Convention given by Article 5, which granted immunities to the inhabitants of a country who succoured wounded; its inadequacy to protect the wounded from pillage and

mal-treatment by prowlers and marauders ; the want of safeguards for the unauthorised use of the Red Cross emblem ; the impossibility of commanders adhering strictly to the provision which entitled captured medical *personnel* to be sent back to the outposts of their own army ; and the complicated conditions involved in applying the articles of the Convention to convoys of sick and wounded. The Red Cross Societies also felt acutely the fact that they were not recognised in any way in the Convention.

Eminent international jurists, such as the late Professor Martens, of St. Petersburg, M. Louis Renault, of Paris, Professor Ariga, of Japan, and others, were active members of their national Red Cross Societies almost from their inception ; and it is not surprising, therefore, that projects for revision of the Convention were an attractive subject of study at the meetings of these Societies. They soon felt, however, that to discuss these projects or pass resolutions upon the subject of the Geneva Convention at the periodical International Conferences of Red Cross Societies was unwise and likely to interfere with the steps which they were anxious to see taken through diplomatic channels to revise the old and draft a new Convention, which should not only remedy the defects of the former but also recognise in a specific form the status of the organised national Red Cross Societies.

Such, then, were the influences and motives which led to the new Convention of 1906. The later wars—namely, the South African War and the Russo-Japanese War—did not produce many instances which demanded any serious revision of the 1864 Convention. By the time these wars were waged the idea of the Convention was better known, and its principles acted upon in the spirit more than in the letter, and by a mutual unexpressed understanding, justified by precedents, that when the provisions were unworkable they would be ignored.

In the provisions of the Convention of 1906 these influences and motives are clearly seen.

The 1906 Convention is now the Convention under which civilised Powers will wage war in the future, although there are some Powers, such as France, who have not as yet ratified it. Strictly speaking, such Powers are bound by the 1864 Convention only, if they have already adhered to it.

It is in examining the 1906 Convention, therefore, that the practical questions which are likely to arise in connection with the application in war of the principles underlying the Geneva Conventions as a whole may best be considered.

Forty-one States were represented at the Conference which drafted this treaty. This is a remarkable instance of the extent to which the ideas of the 1864 Convention had taken hold of nations. With much difficulty and persistent efforts of a few individuals, sixteen nations were induced to consider the drafting of the Convention of 1864 ; while only

fourteen were represented at the Conference which drafted the additional unratified Articles in 1868. Turkey alone of the more important powers abstained from taking part in the Conference for the Convention of 1906. The Peace Conference at the Hague in 1899, the South African War, and the Russo-Japanese War were, no doubt, mainly responsible for this widespread interest, although some of the States represented could not have been in a position to consider the technical questions involved because of the fact that they possessed no definitely organised army medical service. The two influences which predominated most were those represented first by the great international jurists who had already taken part in the deliberations of the Peace Conference of the Hague, and, secondly, by the Red Cross Societies, which were especially strongly represented in the delegations of the French, Italian, Russian, and United States Governments. From the purely military side very little had been expressed to show that the military authorities had any particular desire or interest in revising the Convention of 1864, or in having a Convention at all. The smaller States followed, as a rule, the lead of the jurists and the representatives of the voluntary aid societies. Military points were not always accepted, chiefly because they were not understood.

Some light is thus thrown on the practical points which international jurists in the future will probably be called upon to consider.

The revision of the 1864 Convention was sketched out in changes suggested by a *Questionnaire*, submitted by the Swiss Federal Government. It was simple, and did not go beyond the requirements of the case. The British delegates, however, had gone further and submitted a complete draft of a new Convention, the form of which was more or less the basis of the form in which the new Convention has appeared.

The various provisions are dealt with under different headings or chapters, of which there are eight, followed by the customary general dispositions for the ratification of the Convention and for putting it into force. In all there are eight chapters and thirty-three articles.

The first chapter deals with the sick and wounded of armies. Four Articles are devoted to them. They are given the first place because the Convention is for their benefit and not for that of the medical services or Red Cross Societies. The first Article is an expansion of what was the sixth Article in the Convention of 1864. The only practical addition is that it imposes an obligation on belligerents to give the same care and attention to civilians who are officially attached to armies as are given to soldiers. This addition to the categories of sick and wounded who are to be protected and taken care of is in one sense unfortunate, because it implies by omission no obligation on the part of belligerents to make provision for the non-combatant inhabitants of a country over which war is being waged. These unfortunates frequently suffer severely from sickness and wounds in consequence of the military operations, and their case is then particularly distressing, because they are generally without

medical *personnel* or material for their proper treatment. This was specially marked in the case of the Chinese in Liaoyang and Mukden, during and after the great battles there in 1904 and 1905. Had it not been for the Scotch medical missions in these places, who, it should be mentioned, were given every support by both the Russian and Japanese military authorities in their work, the conditions would have been far more painful and distressing than any which could have prevailed amongst the soldiers.

The first article also introduces an obligation on the part of a belligerent, who leaves wounded behind on retreating before the enemy, to leave also a sufficient medical *personnel* and material for their care. This provision will not impose much hardship or difficulty in the case of the great armies of the Continent; in the organisation of the British Army it may. The Continental armies have a very large medical *personnel* with regiments in the fighting line. In the case of Germany, France, Russia, Austria, and Italy, for example, there are as many as five to seven medical officers with each regiment of three or four battalions and a proportionate number of trained subordinate medical *personnel*. In the British organisation there is only one medical officer with each battalion, and, speaking strictly in the sense of Continental armies, no subordinate medical *personnel*. In the case of Great Britain, therefore, to leave medical *personnel* behind means leaving battalions without medical assistance, or drawing on the purely medical units which are working two or three miles farther back, and which may not be in a position to send medical *personnel* forward when the army to which they belong is retreating. This is a difficulty which is only one example of the difficulties in which the endeavour to enter too much into definitions and details has involved the new Convention. The expression "so far as military necessities permit" has fortunately been introduced here as elsewhere in the Convention to modify some of these practical difficulties. Still, the failure on the part of a belligerent to leave *personnel* behind in charge of wounded, no matter what good reason there may be, is certain to lead to inquiry and recrimination. As a matter of actual practice in war there is no real necessity for leaving medical *personnel* or material behind with wounded left on the field. But in the case of whole ambulances and hospitals filled with wounded, who cannot be moved before a retreat takes place, the complete unit would be left behind. In the case of the greater Powers their extremely well-equipped and organised field medical units are quite capable of taking over any other wounded of the enemy who may be left on the field of battle and not yet collected into its own ambulances and field hospitals.

The second Article of the Convention is intended to make precise what was formerly uncertain—namely, that wounded captured by the enemy are prisoners of war and on recovery will be treated as such. There was a tendency under the old Convention to regard them as entitled to pro-

tection and so-called neutrality at all times. Article 5 of the unratified Convention of 1868 even went so far as to state that even though wounded are not incapable of further service they should be sent back to their own country after recovery, on condition that they do not take further part in the fighting.

Four paragraphs added to the first paragraph of Article 2 of the 1906 Convention, which permit a commander to act as in Article 5 of the 1868 Convention, were added to mitigate the apparent harshness of the bald statement that wounded were prisoners of war; but they impose no obligations on belligerents and are really unnecessary so far as a Convention is concerned.

The third Article is intended to impose upon belligerents the duty of searching the battlefield and protecting the wounded and the dead from pillage and marauders. This provision is the outcome of the experience of the War of 1870-71, when large numbers of wounded were missing and never again traced and when grave atrocities were committed by prowlers on both living and dead for the purpose of pillage. The same article requires that belligerents should take care that the dead are carefully examined before burial; because in war it occasionally happens that wounded are buried alive. The fear that this may happen is very great amongst some nations. In practice it would be impossible to apply exact examination of the killed, and the mention of it in the Geneva Convention is more of the nature of a *memento* than a legal provision.

In Article 4 an attempt is made to prevent in future wars all trace being lost of men who are missing, and to relieve and console the relatives of those who are left wounded in the hands of the enemy, or who are killed. The duties laid upon an army by this Article are onerous, and will require a considerable amount of attention on the part of commanders in the field, and on the part of the medical units. In the first place, commanders will have to make provision for the collection of the various effects, personal possessions, articles of value, letters, &c., found on the field, for putting them into separate packages, each carefully labelled with the name of the owner if possible, for making out lists of these articles, for forwarding them to the base, to the home territory, and eventually to the country of the enemy, with all necessary safeguards in the way of delivery and receipt vouchers, &c. They will have to prepare nominal rolls of sick and wounded of the enemy, and collect marks of identity found on the dead. If all this is not satisfactorily carried out, the belligerent concerned will lay itself open to recrimination by the other belligerent and by its sympathisers in other countries. The relatives will be the first to complain of the non-receipt of information and of articles belonging to their dead or wounded. The largest amount of extra work will be thrown on units in the field, already overloaded with duties and clerical work of a necessary character. The provisions of the Article are not therefore likely to be carried out without some special unit or office

being added to the field army for the purpose. On the whole the Article is inconvenient and awkward. There is no saving phrase "as far as possible," or "so far as military necessities permit" in it; it is a definite obligation. Further, it has no real bearing on the actual care of the sick and wounded, and will not make their lot any better. By taking up the time of medical *personnel* it may even make it worse. It is one of the new ideas which has been introduced into the Convention by Article 14 of the *Règlement* of the Hague Convention of 1899. The Article is also somewhat ambiguous. It does not state clearly whether it is intended to cover the dead and wounded of the enemy only, as regards articles of value, letters, &c., or the dead and wounded of both belligerents. On this point there are likely to be misinterpretations.

The fifth Article of the 1906 Convention is intended to modify the harshness of the withdrawal of the terms of the fifth Article of the Convention of 1864. It was the latter Article, more than any other, which led to the widest possible condemnation of the original Geneva Convention by the military authorities. The 1864 Convention was simply made use of by the civil inhabitants to avoid their homes being used as quarters for soldiers, and to avoid rigorous measures being taken against them by commanders to prevent them performing acts of hostility, or aiding in saving important officers and other combatants from capture. Every inhabitant, who could, hoisted a Red Cross flag over his house on the pretence that he had one or more wounded under his charge. This abuse of the Convention was so apparent and so general that the article has been invariably ignored, and if there was any military incentive to the revision of the 1864 Convention it was to have this Article suppressed.<sup>1</sup>

Yet, at the Conference for the 1906 Convention, many delegates would not abandon the idea that the inhabitants of a country should be encouraged to aid in the care of sick and wounded, and consequently the new Article 5 was introduced to draw the attention of commanders to the advisability of granting special privileges to individuals who help under their control in the collection and care of sick and wounded. If one were to offer any comment on the practical working of this Article, it would be to say that a commander has full power to requisition the

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<sup>1</sup> Professor Küttner, who had charge of an ambulance sent by the Central Committee of the German Red Cross Societies to the aid of sick and wounded Boers in South Africa, reported that: "When the capture of Jacobsdal by the British was considered imminent, the inhabitants of the town prepared Red Cross brassards in bulk; and, in fact, one scarcely met an individual without a Red Cross brassard. Moreover, amongst all these ambulance men and hospital attendants, sprung, as it were, unexpectedly and suddenly from the ground, there was quite a large number of individuals who, the evening before, were in the firing line and had fired on the British, and who did not hesitate to take up their rifles again when the enemy evacuated the place."—Report to Seventh International Conference of Red Cross Societies, St. Petersburg, 1902.

services of such inhabitants and such resources as he may think fit. Requisition of this kind is better than charitable zeal, because only suitable persons and material would then be employed; whereas indiscriminate handling of wounded on the part of ignorant inhabitants is likely to make the subsequent fate of the wounded worse instead of better. The provision that they should care for the wounded *under the control of the military authorities* is intended to obviate this risk to some extent.

Articles 6, 7, and 8 of the Convention form the second chapter, and deal with the medical units and establishments as a whole. The expression *Formations et établissements sanitaires* here takes the place of the technically limited expression *Ambulances et hopitaux militaires* of the 1864 Convention. The organised medical services of modern armies have a series of medical units or formations at intervals from the fighting line back to the fixed hospitals in the home territory. The number, name, and nature of these vary in different armies, and the Continental organisations differ very considerably from the British, mainly because our medical units have been evolved out of the necessities of war in tropical and unpopulated countries, whereas the Continental organisations are intended for war in countries densely populated, with large modern towns and villages, where there are ample resources in the way of shelter for wounded, and with networks of railways and means of conveyance of wounded back from the area of field operations.

A distinction is made in the Convention between the mobile formations and the fixed establishments. The mobile formations are the medical units organised so as to be rapidly transported to various parts of the area of operations at will; the fixed establishments are the more or less permanent hospitals in the home territory, utilized for the reception of sick and wounded from the mobile units. Roughly this is the only definition which can be applied to the terms used in the Convention for the purpose of distinguishing between the two classes of medical units or formations. The meaning of this distinction will be explained under the Articles dealing with material, as it is only the material which is affected by it, not only in the 1906, but also in the 1864, Convention. The object of these three Articles is also to expand and define the protection afforded under Article 6 of the Convention of 1864. In the latter, medical units were protected only when there were wounded in them.<sup>1</sup> Under the new Convention they are protected at all times, except when they are used for committing acts with a view to injuring the enemy.

But the important point in this chapter is the latitude permitted in the possession and use of weapons without infringing the right to

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<sup>1</sup> The Japanese in Manchuria adhered so strictly to the Convention of 1864 that they did not hoist the Red Cross flag over medical units which were closed and ready to move on elsewhere, even though they remained for prolonged periods in one place.

protection, provided the weapons are used for the defence of the medical unit and sick and wounded in it. In the Convention of 1864 no provision of this kind was made, and apart from numerous minor misunderstandings, there were occasions when the lives of medical officers were actually jeopardised by the fact that weapons were found in ambulances and military hospitals.<sup>1</sup> It is recognised in all armies that the weapons and other property of wounded soldiers must accompany them when they are brought into the ambulances and field hospitals, and, in fact, wherever they go, until the opportunity occurs of sending these articles to stores established for the purpose. It is also recognised that the *personnel* for medical services must be armed, because occasions may and have arisen when they have been attacked by prowlers while searching the battle-field and attending to wounded during the night. In some instances, as, for example, in the case of the British hospital in Candia during the rising in Crete in 1899, and in at least one instance recorded officially in the Russo-Japanese War,<sup>2</sup> military hospitals have been attacked and have had to be put into a state of defence by the medical *personnel*. For these reasons the Geneva Convention of 1906 specifically states that the use of arms in self-defence, the guarding of a medical unit by armed men of the medical corps or by picquet or sentinels provided with authority to act as hospital guard, and the presence of weapons and ammunition of wounded, do not deprive the medical unit of the protection afforded by the Convention.

The next chapter on the Convention contains Articles 9 to 13, and deals with the conditions under which *personnel* is protected by the Convention. The *personnel* for medical services in the field is now numerous and composed of various elements. Not only are there medical officers, but in most cases there is an organised corps of non-commissioned officers and men enlisted and trained exclusively for medical purposes. In addition, there are officers, non-commissioned officers and men of the units organised for transport, detachments of whom are attached during war to medical units. Again, in Continental armies for example, there are officers and men for so-called administration services, for keeping accounts and registers, and for obtaining and distributing supplies, who are also attached to medical units. Finally, there are the nursing sisters, who in Great Britain and Russia, (though not so much so in other countries), form a considerable proportion of the *personnel* for medical services. All these are entitled to the protection of the Convention, and provided they perform no acts of hostility must not be treated as prisoners

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<sup>1</sup> During the South African War, Captain Longhurst, R.A.M.C., ran the risk of being shot at Lindley because the arms and ammunition of his patients were found in his hospital pack-store.—“Report on the Medical Arrangements in the South African War,” p. 269.

<sup>2</sup> Ariga, “La Guerre russo-japonaise,” Pedone. Paris, 1908, p. 207.

of war. At the Battle of Mukden, for example, the *personnel* for medical services with the Russian army in the field amounted to almost one-seventh of the total fighting force.<sup>1</sup> The Convention, therefore, may protect a very considerable proportion of an army in the field. It should however, be realised that the Convention does not protect the *personnel* from risk of being hit. It is impossible to distinguish in modern wars between men wearing the Red Cross brassard and others. The former must take the same chances as combatants when under fire.

This protection of *personnel* will probably give rise in practice to some misinterpretation, possibly, too, to some abuse of the Convention, because certain of the *personnel*, notably those connected with transport services, may at one time be employed with medical units, at another with combatant units. The decision regarding protection in the case of capture will have to be determined by the circumstances.

With regard to chaplains, the Convention of 1864 granted protection only to chaplains who were on the establishment of medical units. The 1906 Convention grants protection to all chaplains. The chaplains of most Continental armies do actually belong to the medical units, those of the British Army do not; so that the new Convention in this respect is favourable to our chaplains. How far chaplains should be protected is a matter which has led to some discussion, because it is recognised that the *personnel* for religious purposes may not always be present with an army for the sick and wounded so much as for preaching a holy war, encouraging and inciting men to patriotic sacrifice of life. This is likely to be the case in Mahomedan countries; it was said to be the case in the Russian army during the Manchurian campaign. Professor Renault, in reporting on the final draft of the Convention, had himself apparently some misgivings on this point, for he goes out of his way to say that no chaplain would be attached to an army except officially and would therefore be under control. It is difficult to follow Professor Renault's train of ideas on this point; but he was probably thinking of the French and Continental armies only.

An important point in the protection of *personnel* is the protection now afforded to armed picquets and sentinels who may be guarding medical units. They are specifically mentioned as being under the protection of the Convention and cannot be made prisoners of war. Commanders will be in a curious dilemma in consequence of this, because such persons are combatants, and will join the fighting ranks on release. It is quite possible that the small amount of humane work which they

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<sup>1</sup> According to Dr. Follenfant, the French military medical attaché, there were with the 2nd Russian Army at Mukden an approximate strength of 110,523 combatants, and 444 medical officers, 102 other officers for medical services, 2,450 stretcher-bearers, and 14,048 others connected with medical services, who would be protected by the Convention.

may be called upon to perform in guarding a medical unit may be more than counterbalanced by the wounds which they may subsequently cause.

A class of *personnel* which may claim protection in one army and not in another is the *personnel* known technically as the *personnel* for regimental medical services. In war each combatant unit has a definite number of men belonging to the unit told off to act as stretcher-bearers. In some armies these stretcher-bearers are used only for medical duties at all times ; in others they are employed in such duties only in time of war, or even only during an action. Formerly, most armies considered that such *personnel* had no claim to protection under the Geneva Convention, and they were not provided with a Red Cross brassard, but with a distinguishing brassard which varied in character according to the regulations of different armies. Now the armies of France, Germany, and Austria at any rate have abolished the special stretcher-bearer brassard and place the whole of the regimental medical service under the protection of the Convention, because their stretcher-bearers will not be employed at any time in combatant duties. We have not yet done so, because the wording of Article 9 precludes protection being claimed for such *personnel* unless they are exclusively used for the collection, transport and treatment of wounded.

Two articles have been introduced into the chapter on *personnel* solely for the purpose of satisfying the demands of the voluntary aid societies. So far as the protection of *personnel* of voluntary aid societies is concerned, these Articles—namely Articles 10 and 11—are unnecessary, because such *personnel* would be protected under Article 9 as being an integral part of the service employed for collecting, transporting, and treating sick and wounded. The Convention of 1864, although not specifically mentioning voluntary aid *personnel*, invariably extended its protection to it under a similar article. Still, as I have already mentioned, the spokesmen of the societies at the Conference desired that the wishes of the societies to be mentioned in the Convention should be met ; such recognition, they said, would encourage and stimulate them to greater effort.

In Great Britain we do not realise the extent to which voluntary aid societies, the so-called Red Cross Societies, have become national institutions in countries where there is national military service. The organisation for relief of sick and wounded in such countries is very extensive, and the money subscribed voluntarily is very great. In Japan, for example, about one in thirty-eight of the total population of the country is a member of the National Red Cross Society, which has thus an income of about £300,000 a year. In Austria there are about 55,000 subscribers, and the money so obtained is a kind of voluntary taxation, to add to the Government grants for providing material for medical services. In Russia the National Red Cross Society has become practically a State institution, and part of the compulsory taxation of the

people, such as stamps on telegrams, railways tickets, and taxes on public entertainments, go to its coffers. In all these States the official military regulations for the organisation and employment of voluntary aid in war are as carefully elaborated and as comprehensive as those for the organisation and employment of the regular medical services. The whole organisation is under military medical inspection and counsel in peace, and entirely under military control in war.

These facts help one to understand what is implied in Articles 10 and 11, where only the *personnel* of those societies which are duly recognised and authorised by their Governments is assimilated as regards the protection of the Convention to the *personnel* for medical services. Such *personnel* must be subject to military laws and regulations, and employed in medical units and establishments. Further, each State is required to notify to the other the name of the societies which are authorised, under its responsibility, to assist the regular army medical service.

It will be seen that the conditions under which voluntary aid *personnel* is recognised by the Convention are very stringent. They are necessarily so because of the experiences of the Franco-German War. These experiences have never been forgotten in Europe; at one time they threatened to wreck the existence of Red Cross Societies, and the ideas promulgated by Dunant. In Guelle's work on the "Laws of War" a concise account is given of the abuses which were committed by Red Cross Societies in the field, and the inconveniences caused by them. He states that they became the hotbeds of rivalries and jealousies on account of their conflicting interests; they caused situations embarrassing to the tactical operations; they interfered with the healing of wounds from the fact that men and women, ignorant of the principles of surgery, handled them; and they were the refuge of people animated by other motives than a desire to help the sick and wounded.<sup>1</sup> We had similar experiences in the South African War, two of which were notorious,—namely, the International Red Cross detachment organised and sent out from Antwerp, and an American Red Cross detachment from Chicago. Both were composed of men who had no other intention than that of obtaining admission into the Transvaal under the guise of the Red Cross, with the object of joining the combatant ranks of the Boers. It is on account of incidents such as these that the Convention of 1906 grants protection only to *personnel* of societies for which Governments make themselves responsible. The Article is curiously worded in one respect. It says: "each State shall notify to the other either in time of peace, &c., the names of the societies authorised, &c." As M. Moynier pointedly asks, Which is the other State to whom a State is to notify in time of peace?<sup>2</sup>

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<sup>1</sup> J. Guelle, "Précis des Lois de la Guerre," vol. i., p. 178. Paris, 1884.

<sup>2</sup> *Bull. Intern. de la Croix Rouge*, p. 12, January, 1907.

The right of voluntary aid societies of neutral countries to assist in the care of sick and wounded is also restricted by Article 11 of the Convention. No such society is permitted to assist a belligerent, except with the previous consent of the Government of its own State and with the consent of the belligerent, who, in accepting such aid, must notify the fact to the enemy. In interpreting this Article it is important to assume that the consent of a Government involves that the application to assist a belligerent will be transmitted by official channels, and that in giving consent the Government assumes responsibility for the *bona fides* of the society concerned. The British proposal for revision of the Convention expressly stated the responsibility, but the framers of the Article have left the question of Government responsibility unsettled.

The remaining two Articles of Chapter III. define the manner of dealing with the *personnel* protected by the Convention, when they fall into the hands of the enemy. Under the old Convention they were entitled to be restored to their army by being sent back to the out-posts. This provision, as already noted, was unworkable, and has been ignored in all subsequent wars. In the Russo-Japanese War the Japanese did send some of the *personnel* back to their own out-posts, but as a rule they were handed over to the French Consul at Niuchuang or Chefoo, who made arrangements for their returning to Russia from these ports. This method of disposing of *personnel* protected by the Geneva Convention is now clearly sanctioned by Article 12. They will be sent back to their army or to their country by such route and at such time as are compatible with military necessity. Commanders have thus the very greatest latitude in disposing of them. In the meantime they must carry on their medical duties under the direction of the enemy so long as their services are required.

As compensation for their services, Article 13 provides that they shall receive from the enemy the same pay and allowances as the similar ranks and grades of *personnel* belonging to the enemy's army. When they are sent back to their own army or country they may take with them their private property, including surgical instruments, weapons, and horses. The granting of pay and allowances is a development of one of the Articles of the Convention of 1868. In that Convention the pay was to be the pay of the army to which the *personnel* belonged. In the present Convention it is the pay of the army which captures the *personnel*. This is likely to have some curious results because of the very different rates which prevail in different armies. It will, in fact, be difficult to adjust the financial questions involved, and the Article permits of possible harsh treatment, although intended to have the opposite effect; because pay and allowances in money may at times be valueless in the field. What the captured *personnel* requires most is food and shelter suitable to the rank of the individual. A harsh commander, strictly complying with the letter of the Convention might grant the money, for which Article 13

makes provision, might even state that it will be paid in arrears months afterwards, and at a time when it could purchase neither food nor lodging, and leave the medical *personnel* without either. Such action is perhaps not probable, but there are instances in which the letter of the Convention has been made the excuse for purposely harsh treatment, and the letter of the Convention does admit of harsh treatment in this way.

In his official report on the Article, Professor Renault states that it does not apply to the *personnel* of voluntary aid societies; in other words, such *personnel* when captured is not entitled to pay and allowances. It is true that the Article specifically states that it is the *personnel* referred to in Article 9 to which it applies, but then that *personnel* as defined there cannot well exclude the *personnel* of voluntary aid societies employed for the purpose stated in the Article. M. Renault's opinion can scarcely be regarded as decisive in this respect, and ought not to apply to voluntary *personnel* employed and paid in war by the British military authorities, as for example the members of the St. John Ambulance Brigade, of whom very many were employed in South Africa at rates of pay fixed by the Government. They would clearly come under the category of *personnel* designated in Article 9, even although they are also *personnel* of the voluntary aid societies referred to in Article 10.

The next three Articles—14, 15, and 16—form Chapter IV. and deal with the material of medical units. Here a very sharp distinction in the manner of treatment is made between the material of mobile units, that of fixed establishments, and that of voluntary aid societies.

All material must be used on behalf of the sick and wounded so long as it is required for that purpose; but in the case of mobile units, the material, including ambulance wagons, other transport material, and their teams, must be restored in the same way as the *personnel*. The reason of this is that mobile medical units are specially organised formations for the express purpose of bringing medical aid to the wounded as near as possible to the place where and the time when they fall. They are of little use except as an organised whole, with *personnel*, material, and transport. On the other hand the fixed establishments are, in Continental phraseology at any rate, the permanent hospitals or temporarily organised hospitals in fixed localities in the home territory. To give the *personnel* of these establishments power to remove the hospital equipment would be to render the hospital for the time being useless. On that account the Geneva Convention provides that the material of fixed establishments becomes subject to the laws of war, but states that it may not be diverted from its legitimate use as material for treating the sick and wounded, so long as there is need of it for this purpose.

In case of military necessity hospital buildings may be destroyed or

dealt with in any manner a commander may think fit, provided he makes provision beforehand for the sick and wounded in it.

These provisions are simple enough, but it will be somewhat difficult to determine, in the organisation of different armies, what units come under the definition "mobile," and what under the definition "fixed." In the Austrian regulations the difference is more or less defined, in other regulations the definition is not so clear, although generally the establishments regarded as fixed are those in the area described technically in military language as the home territory. In France, Germany, and Japan these establishments are called *reserve hospitals*. The classification of the British units will be much more difficult, as we use the expression *stationary hospital* to describe a class of hospital which in Continental armies would come under the category of mobile. Similarly our large base or general hospitals, as organised for oversea warfare, are of a distinctly mobile character, although the same class of hospital as organised for use in the home territory is a distinctly fixed establishment. Our stationary and general hospitals for oversea expeditions are in fact a sort of movable camp, like a nomad village, and on that account should be regarded as mobile.

But the greatest difficulty of all will arise in putting into practice the provision in Article 16, which regards the material of the voluntary societies protected by Article 10 as private property. As such it may be requisitioned but it cannot be confiscated. The article was introduced because Continental Red Cross Societies own a large amount of property in the form of permanent buildings and stores full of hospital and other equipment. It will be difficult, however, to distinguish in many cases between the property of Red Cross Societies and the property of the State, unless the societies adopt some distinctive sign other than that of the Red Cross, or in addition to it, because in some armies, notably in the Austro-Hungarian Army, material belonging to the Red Cross Societies is an integral part of many of the field units of the regular army medical service. Another complication arises from the fact that in some States, such as Russia and Switzerland, the Red Cross Societies receive State subsidies. Can material bought and maintained by such subsidies be regarded as private property? The Convention undoubtedly says "Yes," and a State which wished to save the confiscation of its material for medical services has only to make Red Cross Societies responsible for its provision and subsidise them for that purpose. In Austria, in fact, much of the essential medical equipment, such as the first field dressings and most of the ambulance wagons of field medical units, as well as the uniform and equipment of some 4,000 reservists and other soldiers and the harness of Government horses required for the wagons, are provided by the Red Cross Societies.

In practice commanders would be justified in regarding as material belonging to the State all material marked with the red cross, and only

such as is marked with some additional distinctive sign as material belonging to Red Cross Societies. The Continental Red Cross Societies and Orders of Knighthood do fix their badges, in addition to the red cross, at any rate on the transport material provided by them.

Chapter V. has one article only and deals with convoys of sick and wounded. It is a somewhat complicated article and not readily understood without technical knowledge of the meaning of the Continental expression *evacuation*. In the heading of the Chapter the expression *convoys of evacuation* is used. In army medical organisation the zones of medical work are divided into the zone of collection of sick and wounded, which corresponds with the area of active operations immediately in front of the enemy, the zone of evacuation or removal of wounded from this area to the fixed establishments in the home territory, corresponding generally with the lines of communication, and the zone of distribution or home territory. Convoys of evacuation of wounded refer in this system to the medical units employed for the purpose of carrying sick and wounded by road, rail, or water in any of these zones, but especially in the zone of evacuation. They are of a very varied character and include hospital trains and ships. By road they may be made up of regular ambulance wagons, empty supply or ammunition wagons, requisitioned country carts, or any other suitable transport material.

The Geneva Convention gives such convoys the same protection as is given to the mobile medical units; that is to say the *personnel*, including any military escort for protecting the convoy, cannot on capture be treated as prisoners of war; and the material must be restored. The only special condition made is that military vehicles other than those specially belonging to the Army Medical Service may be confiscated and that the convoys may be broken up if necessary, provided the sick and wounded in them are taken care of.

Hospital trains and hospital ships and boats for internal navigation, it will be observed, must be restored. There will be many practical difficulties in carrying out the conditions imposed upon commanders by this, especially as regards the restoration of railway rolling stock. If a hospital train is left behind, the chances are that the locomotive will first have steamed away. Is the capturing commander to place a locomotive at its disposal? Is he to keep a line uninjured or a gauge unnnarrowed to fulfil the obligations of the Convention? Otherwise, how is a train to be restored? As the conditions regarding restoration are those applicable to mobile medical units commanders have power to select the time and place of restoration according to military necessity, and the difficulties may thus be surmounted.

Another question is involved in connection with hospital trains. Can a belligerent stop a hospital train; if so, how? The question has been raised in connection with an incident in the Russo-Japanese War. A

hospital train steamed away from Port Arthur, when the Japanese threatened to cut off communications from the fortress, and it was supposed that important officers, such as the Viceroy, Admiral Alexeieff, escaped in it. Would the Japanese have been justified in taking measures to stop the train? Article 17 of the 1906 Convention makes no distinction between intercepting a convoy by road or a convoy by rail, and if the one may be intercepted so may the other. The accepted solution now is that a hospital train may have a shot fired across its line of movement as a signal to stop. Commanders will in any case demand the right to stop hospital trains for the purpose of examination, just as they have the right to stop hospital ships in naval warfare. The difference in the two cases is that the hospital ship is obliged to stop on being signalled, a hospital train is not. But, if it ignores the signal, it would probably have a shot fired into it.

Six articles are devoted to a chapter on the distinctive sign by which medical units and establishments, *personnel*, and material protected by the Convention are to be recognised in the field. The sign is a red cross on a white ground, and it is declared to be the emblem of the Army Medical Services. This declaration is important, because it is generally regarded as the emblem of the Red Cross Societies. It is important specially in connection with material and with legislation for preventing abuse of the sign. *Personnel* will wear it in the form of a brassard or arm band, which must be fixed to the left arm,<sup>1</sup> and be delivered and stamped by competent military authority. In the case of individuals, such as voluntary aid *personnel*, who do not wear a military uniform, the wearer of the brassard must be in possession of a certificate of identity entitling him to wear it. No mention of certificates of identity was made in the Convention of 1864, and the form of certificate of identity is likely to vary much in different armies, unless some uniform form is agreed to.

Medical units will show the distinctive sign on a flag, which must also be accompanied by the national flag of the belligerent to which the unit belongs, or, in the case of a unit from a neutral power, to which it is attached. During the South African War a Dutch ambulance floated the Netherlands flag alongside the National flag, and by order of Lord Kitchener the former was removed on the ambulance falling into our hands. The incident led to diplomatic notes being exchanged as to Lord Kitchener's right to haul down the Netherlands *national flag*, which is the term used in the Convention of 1864 then in force. Most inter-

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<sup>1</sup> The intention in inserting the word "fixed" into the provisions regarding wearing the brassard is to impress those wearing the brassard with the fact that it must not be worn in such a way as to be easily removed and put on again at will. In future, persons wearing the brassard loose will run considerable risk of being regarded as wearing it without proper authority, or of having no protection under the Convention.

national jurists considered the action justified, as the national flag could mean only that of one or other of the belligerents.<sup>1</sup> In the Convention of 1906 all doubt on this point is removed. Further, the Red Cross flag may only be hoisted with the consent of competent military authority, and only on units protected by the Convention.

A concession to the *amour propre* of medical units which fall into the enemy's hands is made in the 1906 Convention. The Red Cross flag only will then be flown. Under the Convention of 1864 it was the custom to haul down the national flag of the captured belligerent and hoist that of the capturer alongside the Red Cross. The wisdom of the 1906 article is doubtful, because it can readily be conceived that greater protection might be afforded by the flag of the belligerent who occupies the territory in which the captured medical unit is placed, than by a Red Cross flag without any national flag.

The distinctive sign, and the expressions "Red Cross" or "Geneva Cross" are not to be used in peace or in war, except as the mark of protection of units, *personnel*, and material designated in the Convention.

All these articles are clear, and are not likely to lead to misinterpretation. One point of interest may, however, be mentioned. Much trouble was taken at the Conference to declare the fact that the red cross had no religious significance; and the wording in Article 18, "as a compliment to Switzerland," and "heraldic emblem," are used purposely to give point to this. Japan, China, and Siam, which may be regarded as non-Christian powers, stated that they attached no religious significance to the emblem and accepted it; the Persian representatives signed with reserve on this article; and Turkey was not represented. In my opinion it would be difficult to induce Mohammedan powers to regard the red cross on a white ground as other than an emblem derived from the time of the Crusades. One has only to visit the gallery of the Crusades in the palace at Versailles to understand this. In the pictures there the Geneva Cross appears everywhere on white pennants, shields, and cloaks of Christian knights. In the picture of the capture of Jerusalem it floats proudly on the highest fortress of the city above a drooping green flag bearing the emblem of a white crescent. One cannot therefore be surprised at the attitude of Turkey in refusing to use, as she has done in the past, the red cross as the emblem of protection of her army medical units and *personnel*, or in Persia signing the Convention with reserve. Turkey now uses a red crescent and Persia a red sun; but it is unfortunate that some sign could not have been sought which would satisfy all. The suggestion was made, but sentiment was too strongly in favour of the red cross. In this connection it may be noted that in the Napoleonic Wars an orange-coloured flag was used as a distinguishing

<sup>1</sup> In any case the Netherlands ambulance had no rights under the Convention of 1864 at all, because voluntary aid units are not recognised in it.

sign for dressing stations ; in the Civil War in America a yellow flag was similarly used. There are precedents, therefore, for the use of other signs than the red cross.

Chapter VII. has three Articles defining the conditions under which the Convention comes into force, and imposing on commanders into the field the duty of carrying out its provisions, and on signatory Governments the duty of taking steps to instruct the Army in its provisions and to bring them to the notice of the people.

The final chapter contains two Articles, specially introduced with a view to checking the abuse of the red cross emblem in war, and the misuse of it in time of peace. A signatory power undertakes to introduce legislation on the latter point within five years of its ratifying the Convention. Great Britain signed the Convention with reserve on these Articles, and on Article 23, which could not hold good without legislation. France has delayed ratifying the Convention until the legislation it undertook to introduce in signing these articles is in progress. Many of the other signatory Powers had already legislated on the subject. The object is to prevent the red cross being used as a trade mark, merchandise mark, badge of a sisterhood or friendly society, or by any individual who chooses to use it. It is obvious that in time of war much inconvenience would be caused by all kinds of houses and articles being labelled with the red cross. There is at present no municipal law in Great Britain preventing this use of the emblem or words.

With regard to the general dispositions there is no time-limit fixed for ratifying the Convention, although a time-limit of four months after signing was fixed in the case of the 1864 Convention. The 1864 Convention holds good between belligerents who have ratified that Convention only, even though one of them may have ratified the Convention of 1906. When both belligerents have adhered to the latter Convention, that of 1864 ceases to be in force between them. Other general dispositions do not affect the practical application of the Convention in war.

I have laboured too much, perhaps, over the details of this Convention, but you will find in it many other points which will require interpretation by experts, and which only practical experience will bring to light, as happened in the case of its predecessor. Even a comparatively long lecture such as I have detained you with does not admit of all the points being considered. The 1906 Convention is the better Convention of the two, as it has endeavoured to meet all the practical difficulties experienced in applying the Convention of 1864, and to remedy its defects. But it has at the same time introduced new matter, and in some instances complicated details, which no doubt will also produce their crop of experiences in the future. In actual war, commanders and armies generally will welcome what is good in it ; what proves unworkable will probably be ignored.

## Reviews.

**THE WAR OF THE SECESSION, 1861-62: BULL RUN TO MALVERN HILL.**  
By Major G. W. Redway. Special Campaign Series. Swan, Sonnenschein and Co. Price 5s. net.

The author tells us that though the labour of a lifetime were needed to acquire and digest all the information on the American Civil War, yet as a result of a few years' study of the war records certain general impressions remain, which it has been his endeavour to set forth, in the belief that most of the latter-day problems of defence were practically solved by the events of 1861-62. Two-thirds of the volume are devoted to a survey of such phases of the campaigns of the first year of the war as he conceives to possess a living interest. But to the general reader the first six chapters in which he sets forth some broad views of the War of Secession will be of most interest. Major Redway uses the word "Secession" instead of "Rebellion" advisedly. He shows that every State that seceded proceeded regularly by passing an Ordinance of Secession, and that President Lincoln accepted the resignation of their commissions by Southern officers in the "United States" navy and army, before they went home as civilians to take service with the "enemy."

As to the causes of the war, the Southern States had excellent reasons for dissolving a partnership which had become irksome. The phenomenal development of the Northern States on manufacturing and commercial lines, which demanded white craftsmen, while the Southern States remained an agricultural region, had not been foreseen when the Union itself was established on the basis of slave-holding. In the South the exigencies of field labour in a semi-tropical zone excused what the law justified—namely the continuance of negro slavery as a domestic institution, while the Northerners could well afford to indulge altruistic sentiments in favour of personal liberty, as it affected a race with which they had nothing in common.

Again, to the South, as agriculturists, import duties were obnoxious, raising the price of farm implements, clothing, and luxuries; whereas the manufacturing industries of the North were fostered by a tariff wall.

At the outbreak of war the "assets" of the Union in the shape of regular troops were 14,600, and this number varied little throughout the war, during which the effective strength of the Federal forces averaged half a million men. In the Southern States there was no nucleus of regulars, but there was a larger number of genuine volunteers. Major Redway discusses the question of so-called "volunteering" at length, and shows that the Northern states came to graft upon their Militia system in war the practice—which we began to imitate to our cost in the South African War—of paying famine prices for untrained men. One result of this was that the South had to guard and feed 190,000 prisoners. In 1861 the dearth of leaders was so great that practically anybody who could show that he had received a military education had the choice of any post for which he could qualify. In June, 1862, Lee had not yet "arrived," and, though the South had no monopoly of West Point graduates, until the coming of Grant and Sheridan from the West, in 1864, the Federals never

had a fighting general of even respectable ability. Avoidance of disaster rather than victory in battle seems to have been their object. Policy overcame strategy, and dictated that the rival capitals—separated by a less interval than is Hull from London—should be covered by armies operating directly under the eyes of the rival Presidents. Davis tied his generals to the defence of Richmond and made no use of the Southern States. In its earlier stages the war was waged by committees, and policy was parochial in character. The politicians talked strategy, and the soldiers talked politics. In fact the armed forces in 1861-62, at an enormous cost in life and suffering, were merely practising hostilities, and training their leaders for the real struggle to come two years later. Looking back over the events of 1861-65, Major Redway remarks that it is easy to see that the greatest obstacle to the defence of a country is the population itself; that measures for resistance to invasion must include the establishment of a military government from the outset; that martial law must be proclaimed, and that all men who are fit must be enrolled for general service, except those whose skill is valuable as producers of food, clothing, and material of war, to whom civil duties must be assigned, and regarded as service to the State equally with military duties. But private interests, personal property, and individual rights must be temporarily surrendered. The difficulty of procuring the rank and file of an army fades into insignificance beside that of obtaining officers, and a nation is more likely to throw up a Washington or a Cromwell in time of need than to find ready-made a class of men like the serjeants of a standing army.

As in policy and strategy, so in tactics, a certain equilibrium was preserved which proved fatal to the cause of peace. A decisive victory at Bull Run in 1861, and at Cold Harbour in 1862, might have ended the war, but on neither side was there sufficient "finishing power" in the victors to effect the destruction of the enemy on the field of battle. On the other hand, the amount of punishment which was gamely endured by troops, who had not been disciplined as regulars, was at times astonishing. Thus, at Seven Pines, Hill suffered a loss of 44 per cent. in three brigades (that at Balaclava was 49 per cent.) and yet carried both lines of defence.

As to the co-operation of the Navy, the blockade of the confederate ports is one of the classical examples of sea power given by Mahan; it was a purely strategic operation, "a steady and strangling pressure upon the enemy's lines of communication, with the result of producing exhaustion through the failure of necessary resources."

The medical administration of the Federal army was entrusted to Surgeon Tripler as "Director," who, however, found it difficult to improvise an efficient medical staff, especially as his civilian colleagues derided all systematic arrangements as "red tape." The establishment authorised one surgeon and one assistant per regiment, but no provision was made for a staff from which medical officers could be allotted to hospitals and casualties made good. No epidemic diseases appeared during the Yorktown campaign; dysentery, typhus, and cholera were almost unknown. But straggling and malingering were as rife as they were when McGrigor arrived at Lisbon half a century earlier. Dr. Tripler dealt with the chaotic state of affairs in the same way as did

his great predecessor, by the establishment of regimental hospitals for the treatment of minor cases.

Major Redway says that probably no such instructive reports in connection with the health of an army had ever before been made as those of Dr. Tripler and Dr. Letterman in 1862; and they bore immediate fruit in a thorough reorganisation of the medical services of the army of the Potomac. He adds that even to-day they afford to the combatant officer an education in sanitary discipline.

J. T. C.

VACCINE THERAPY: ITS THEORY AND PRACTICE. By R. W. Allen, M.D., B.S.(Lond.). Third Edition. Demy 8vo, pp. x. + 277. Price 7s. 6d. net.

The appearance of a third edition of this book in less than three years is an indication of the great advances that have been made in vaccine therapy.

This third addition has been completely revised and the subject-matter rearranged.

In the first two chapters a brief but clear and comprehensive account is given of the nature, the source, and the mode of determination of opsonins. It seems to us that the strictures passed on the dilution methods of estimating the amount of opsonin present in a given serum are too severe, though we agree that for ordinary clinical work these methods are too laborious.

In Chapter III. is described the preparation of the vaccine, and we note that the statements which were criticised by our reviewer of the second edition have been considerably modified. The statement that "incubation should be maintained for three days before a negative result is assured" in the case of a blood culture in broth might be questioned. For instance, in the case of Malta fever five to seven days is nearer the limit of safety.

The chapter on the opsonic index in health and disease, and its value as a guide in vaccine therapeutics, is interesting as showing that the author has considerably modified his views on the necessity of employing the opsonic index as a guide in vaccine therapy. As indicating his present position we may quote what he says at the end of the chapter: "Except for its (the opsonic index) aid, vaccine therapy would never have occupied the place it does to-day, but obstinate adherence to it will only tend to impede the march of progress." In subsequent chapters, when dealing in detail with various infections, he points out what substitutes may be employed, especially in connection with tuberculosis.

Most of the author's own experience appears to have been in connection with catarrhal infections, and this subject is fully dealt with.

The remarks on the use of vaccine in typhoid carrier cases are misleading, as one successful case is recorded while no mention is made of the many failures.

Mention might have been made of the recent experiments in the use of sensitised bacilli in the prophylaxis of dysentery.

As a compilation of facts concerning vaccine therapy the book is worthy of perusal by the bacteriologist, and as a guide to the general practitioner it should be most useful.

J. C. K.

ANNALS OF TROPICAL MEDICINE AND PARASITOLOGY. Vol. iv., No. 1.  
(Amazon Yellow Fever Expedition). Liverpool University Press.  
Price 10s. 6d. net.

This number contains an interim report on the Amazon Yellow Fever Expedition, which was sent out by the Liverpool School of Tropical Medicine, in 1905. Of the two members, Dr. Brinl had to return to England soon after arrival, on account of complications following an attack of yellow fever, and Dr. Thomas was left to carry on until 1909, when he, in his turn, had to come home on account of ocular troubles. Partly because of this, and partly on account of the difficulties in obtaining sufficient numbers of anthropoid apes, the experimental work was not completed, but Dr. Thomas informs us that chimpanzees were successfully infected, and that he got certain symptoms in rabbits and guinea-pigs after injection of human blood from yellow fever cases, but the publication of details regarding these experiments is postponed until later. The present number commences with a description, by Dr. Thomas, of the *sanitary conditions and diseases of Manaos*, where the expedition worked, a tropical town on the Rio Negro, intersected and surrounded on all sides by creeks and swamps, the houses dark, damp, dirty, and overcrowded, littered within and without with pots, pans, and bottles; the people in great part provided with no sanitary conveniences, and defæcating anywhere. It is not surprising to read that malaria is rife, the blood-rate among children living near the swamps in the suburbs being about 50 per cent.; that yellow fever is the regular lot of the new-comer, and that something like 90 per cent. of the population are infested with *Necator americanus*.

The second paper, also by Dr. Thomas, consists of a description of the *post-mortem* appearances in a case of *esophagostomiasis in man*, the second to be recorded; the abdominal organs were found to be matted together, with pockets of pus among the coils of intestine; almost the whole length of the large intestine, and the lower three feet of the ileum also, were studded both on their peritoneal and mucous coats with small nodules varying in size from that of a pin's head to that of a pea, often, on the large intestine, aggregated into plaques; these tumours, when recent, consisted of cysts containing the larvæ of a worm which MM. Railliet and Henry (in a succeeding article) class as a variety of *Esophagostomum stephanostomum*, a parasite of chimpanzees, and which they propose to name *Æ. stephanostomum var. Thomasi*.

Following on this is a description by Dr. Thomas of a disease known as *mossy foot*, which affects the natives of the Amazon region. In the case described the patient hurt his foot about nineteen months before it was seen by Dr. Thomas, the foot remained tender and swollen for a year, then small vesicles appeared on the outer side of the heel; these, after a couple of weeks, gave way to a dry warty growth, which spread round in confluent fashion on to the dorsum of the foot, until, at the time the patient was seen, there was a mass resembling a pad of dry moss covering the anterior portion of the dorsum of the foot and the dorsum of the toes; the leg was swollen and tender up to the knee, and the growth itself was tender, and bled easily. That the disease is an infective condition is shown by the fact that Dr. Thomas succeeded in inoculating a rabbit on the nose. The disease followed the same course as in man, first vesicles,

then warty growth; the animal infected its hind paws from scratching, and subsequently the ears became involved.

Then come two papers by Marsden and by Nierenstein on the *pharmacology of guarana*, which is much used in Brazil for the treatment of diarrhoea and dysentery. Nierenstein has isolated from the preparation an alkaloid which he names  $\beta$ . *guarinine*, and which, contrary to the usual teaching, he states is not identical with theine.

A *lecture on Yellow Fever*, delivered by Dr. Thomas at the Liverpool School of Tropical Medicine, follows. In it one gets a very graphic account of the disease. For treatment the lecturer recommends a preliminary purge and hot pack if the case is seen early, no food of any description for the first three or four days, and the administration, in small quantities at a time, of at least 3 litres daily of alkaline diuretic water such as "Vichy source celestins"; for the rest every effort is directed to keeping the kidneys active, caffeine citrate is given when necessary to this end, and large enemata of saline. Adrenalin chloride in doses of 20 to 40 drops of the 1 in 1,000 solution is recommended for the black vomit if it occurs.

The number closes with a paper by Newstead and Thomas on the *Mosquitoes of the Amazon region*. In this the writers give the results of an experiment confirming Theobald's findings on the viability of the eggs of *Stegomyia calopus* under conditions of drying, &c. Eggs laid at Manaus on September 9th to 11th were dried over calcium chloride for twenty-four hours, then despatched to England where they arrived on October 26th. They were immediately placed in water at 23° C., and on the following day twelve larvæ hatched out, of these three (two males and one female) reached the stage of imago on November 7th and 8th.

W. S. H.

**FRACTURES AND SEPARATED EPIPHYSES.** By Albert J. Walton, F.R.C.S., M.S. Pp. vii. + 288. London: Edward Arnold, 1910. Price 10s. 6d. net.

Mr. Walton has dedicated this book of 300 pp. to the students of the London Hospital. While they are to be congratulated on having access to such a well-written book, the dedication is by no means a full indication of its value. The subject-matter is far wider than is usually found in a student's manual and the volume contains information useful to all practitioners, and especially valuable to officers of the Royal Army Medical Corps. There are none of the latter who are not frequently called upon to treat fractures and their complications, and probably few who have not occasionally found disappointment in their results. To these much help and possibly some comfort will be found in a study of these pages.

Attached to the description of individual fractures the author has included a carefully considered prognosis of what may be expected as an ultimate result.

This prognosis is especially valuable as it is discussed from a medico-legal aspect, and an attempt is made to fix a period of time following the injury during which the patient will be partially, or totally incapacitated. The conclusions enunciated have been based on a series of cases, and are free from the airy optimism so frequently associated with hospital teaching. The book is well illustrated, and a number of excellent radiographs show the more usual fractures and epiphyseal separations.

The general methods of treatment, such as immobilisation, massage, and open mechanical fixation, are carefully and dispassionately discussed, while the treatment of special fractures is elaborately described.

If one could find a fault in this small volume it would fall under the heading of Sins of Omission.

It is regrettable that Mr. Walton has purposely omitted a description of fractures of the skull and spine, and only briefly touched on fracture-dislocation of the shoulder.

J. W. H. H.

**THE COMPENDIUM OF MEDICINE AND PHARMACY.** By C. J. S. Thompson, Fellow of the Royal Society of Medicine, &c. Size 6 in. by  $\frac{3}{4}$  in. Pp. viii. + 332. Bound in blue leather. London: John Bale, Sons and Danielsson, Ltd. Price 5s. net.

This will be found to be a very useful little book of reference for medical practitioners and pharmacists. Its convenient size enables it to be carried in the pocket, and, in addition, it is well and clearly printed.

The important preparations of the British Pharmacopœia are given, together with a description of well-known unofficial formulæ, and a synopsis of remedies contained in the Pharmacopœia of the United States, France, Germany, and of the Indian and Colonial Addendum to the *British Pharmacopœia* of 1908. Much valuable information is given as regards the various processes used in the art of pharmacy, and the special tests for drugs, chemicals and their preparations. "The Poison and Pharmacy Act, 1908," is detailed and fully explained, and an excellent table of poisons and their antidotes is given.

In addition, there are numerous sections, dealing with urine analysis, clinical bacteriology and chemistry, milk analysis, physics, &c.

The book is full of useful information, put in a practical way, and will be found to be of great use to medical officers, more especially those serving abroad.

F. M. M.

**PRACTICAL NURSING FOR MALE NURSES IN THE ROYAL ARMY MEDICAL CORPS AND OTHER FORCES.** By Major E. M. Hassard and Mrs. A. R. Hassard. "The Oxford Medical Publications." Crown 8vo, pp. 339. Messrs. Hodder and Stoughton. Price 3s. 6d. net.

This excellent manual is to be thoroughly recommended. It is written in close conformity with the syllabus contained in standing orders for the Royal Army Medical Corps. The syllabus, as all officers of the Corps are aware, contains detailed instructions as to the matters to be dealt with in the lectures and demonstrations given by matrons and sisters of the Queen Alexandra's Imperial Nursing Service. This book will be found of the utmost use to those entrusted with such responsible duties. The many chapters are written in a clear and simple style. Nursing detail is fully gone into, and throughout the volume care has obviously been taken not to encroach upon the domain of either the physician or surgeon. The chapters on the nursing of malaria, enteric fever, and plague are extremely good, and will well repay perusal.

This book is strongly recommended to all those (officers of the Corps and members of the Q.A.I.M.N.S.) who are concerned directly or indirectly with the training of the nursing section of the Royal Army Medical Corps.

F. M. M.

ELEMENTS OF PHARMACY, MATERIA MEDICA, AND THERAPEUTICS. By Sir William Whitla, M.A., M.D., LL.D. Crown 8vo, pp. 762. London: Baillière, Tindall and Cox. Price 9s. net.

This, the ninth edition of Sir William Whitla's well-known book, well maintains its former reputation. It has obviously been re-written, and all of it has been carefully revised and brought up to date.

Part I., dealing with Pharmacy, is excellent, and every practical process of the art has been fully dealt with. The tables showing the relation of the Imperial system of weights and measures to the metric system are simple and well defined, and can readily be understood by beginners.

Part II., "The Administration of Medicines," is most comprehensive. It deals not only with the administration of medicines, but also with their combinations. The proper mode of prescription writing (at present often ignored) is thoroughly explained, with Latin examples, and the meaning of the grammar used thoroughly elucidated. Dosage, and a most useful description of therapeutic agents, arranged in groups, are also given.

Part III. deals with *Materia Medica*, and is written in conformity with the "British Pharmacopœia." Unfortunately, presumably in binding, a section dealing with the chemical reactions of the official remedies has been interpolated with this part, making it at first rather confused reading.

Part IV., on Therapeutics, is excellent throughout. The actions of the various drugs are clearly and concisely stated, their properties and antagonistic qualities being fully dwelt upon.

Part V., "Non-official Remedies," is for the most part new matter, a short description of several hundred remedies being incorporated in it, including an account of the new sera and vaccines. This is a most valuable addition to the book, especially as regards the latter. There is a most useful index of poisons and their antidotes. The subject is treated in a very practical manner, and is not overburdened with unnecessary detail. The book is strongly recommended for the use of medical officers, and will be found to be of the greatest use to those who are instructing members of the corps for qualification as dispensers. It is a book which should be within the reach of all who have to do with the compounding and dispensing of medicines; duties which, it is needless to say, are of a highly responsible and technical nature.

F. M. M.

SYNOPSIS OF THE BRITISH PHARMACŒOPIA, 1898. By W. Wippell Gadd. Barrister-at-Law. With Analytical Notes and Suggestive Standards, By C. G. Moor, M.A., F.I.C. Seventh Edition. Pocket size, pp. 227. London: Baillière, Tindall and Cox, 1910. Price 1s. net.

This excellent little book will be found most useful to all medical officers, more especially those who have to do with the training of dispensers. It deals with all the chemicals, drugs, and preparations contained in the *Pharmacopœia*, and also gives the processes for the manufacture of tinctures, articles employed in chemical testing, the composition of volumetric solutions and indicators; and, in addition, there is a most valuable synopsis of the Poison Laws of Great Britain and Ireland.

The Metric and Imperial System of Weights and Measures are

trasted in a series of well-constructed and simple tables, and a scale showing the relation of Fahrenheit to Centigrade degrees is also given.

The book is small enough to be carried in the waistcoat pocket. It is well and strongly bound, clearly printed. The marvel is that such a useful publication can be produced for its small price.

F. M. M.

## Current Literature.

**Diphtheria and Pseudo-diphtheria Bacilli.** M. E. Job (*Journal de Physiologie et de Pathologie générale*, March, 1910, p. 220) has compared the merits of methods which have been introduced recently for the identification of diphtheria and pseudo-diphtheria bacilli. He finds Neisser's new process the best of the staining procedures. Neisser's fluids are:—

A	Methylene blue	..	..	..	..	1
	Alcohol	..	..	..	..	20
	Distilled water	..	..	..	..	1,000
	Glacial acetic acid	..	..	..	..	50
B	Crystal violet (Hochst)	..	..	..	..	1
	Alcohol	..	..	..	..	10
	Distilled water	..	..	..	..	300

Two parts of A are mixed with one of B. The film is stained with this for fifteen seconds, washed and counterstained with a 1 in 300 watery solution of chrysoidin.

Job is of opinion that if polar staining be visible in a culture not older than twenty-four hours, then the bacillus is diphtheria. Should the examination be negative, he attaches importance to the size of the bacilli—pseudo are shorter than diphtheria bacilli, and are not arranged in Chinese letters—and to their number in comparison with other bacteria present.

It would then be necessary to study the sugar reactions. Rothe's medium gives the most satisfactory results. Rothe adds one part of sugar-free neutral broth to four of ox-serum. With ninety parts of this he mixes ten of Kahlbaum's litmus solution, in which 10 per cent. dextrose or levulose has been dissolved. This litmus fluid is sterilised by heating to 100° C. for two minutes on three successive days. Plates are made by heating till coagulation takes place. Diphtheria bacilli redden the levulose and dextrose media. Pseudo-diphtheria growths do not change the dextrose plates but sometimes attack the levulose.

Job regards the pseudo-diphtheria bacillus as a harmless saprophyte.  
C. B.

**Non-venereal Syphilis.**—It is now possible to distinguish between the molecular and vital movements of the *Treponema pallidum* by means of dark-ground illumination, the method which surpasses all others for the identification of this spirochæte. Hartmanni, in *Derm. Zeit.*, 1909,

p. 633, has collected all that is known of the vitality of the *T. pallidum* outside the human body. The powers of resistance of this organism are feeble. Drying destroys it immediately. Momentary exposure to a temperature of 45° C. kills it at once. It is unable to withstand the antiseptics which are usually employed; nevertheless it will survive some days in saline fluid or serum. The reviewer has observed *T. pallidum* active and living in the serum of a chancre collected in a capillary tube four days previously. Bier states that they will survive twenty days when preserved anaerobically. Arning Klein found them living after four weeks in cover-glass preparations edged with vaseline and kept in the dark. Gaston has obtained them still alive from a liver removed from a luetic cadaver ten days before the examination. These observations have an important bearing on "syphilis insontium."

Scheuer (*Deut. med. Woch.*, No. 10, 1910) has published a case of vulvar chancre which he believed was contracted by infection conveyed on a sponge which had been used one and a half hours previously by a woman who had secondary lesions on her genitals. Scheuer ascertained by microscopical examination that the *T. pallidum* would survive for two hours on this sponge if it remained moist. If allowed to dry they could not be resuscitated.

C. B.

**Female Nurses of Voluntary Aid Societies, Germany.** (Extract from *Unterrichtsbuch für die weibliche freiwillige Krankenpflege*, compiled by Generalarzt Dr. Körting, for the Central Committee of the Prussian Red Cross Society).—This book is a manual of instruction specially written for female nurses. The first few pages give an outline of the physical, moral and educational qualifications which are essential for any woman who hopes to become a useful nurse. The nurse's position with reference to her superiors is laid down in her contract to serve when called on in war-time; advice is given as to how she should treat her subordinates in hospitals.

All ladies must be of German nationality and irreproachable character, and must undertake to serve for a minimum period of three months if called up in war-time.

Section V. defines the classification of lady nurses as follows:—

(1) Sisters: They must have trained for a complete year and passed the State examination at the end of their training; they receive a trained nurse's certificate from the Government.

(2) Assistant Sisters: They must have trained in a hospital for six months and passed the examination. They receive an assistant sister's certificate from the Red Cross Society.

(3) Assistants: They must have undergone a definite course of four weeks' instruction in first aid and nursing and pass the examination. They receive an assistant's certificate from the Red Cross Society. At least every second year they ought to attend a refresher course of four weeks; during these courses practical instruction is to be given in interior economy (*i.e.*, cooking, washing, &c.) of a hospital.

(4) Sisters and assistant sisters are to be instructed as laid down in the Government manual of nursing; assistants are to be instructed as laid down in this work.

Section VI.—*Employment.*

(1) Voluntary aid female nurses may be employed as follows :—

(a) With the army in the field.—In hospitals on the lines of communication; with stationary hospitals, or when specially sanctioned by the general officer commanding-in-chief in field hospitals; with convoys of sick and wounded proceeding by rail or water from the lines of communication to the base. On the lines of communication only sisters holding Government certificates will be employed.

(b) In the home territory.—As nurses, or in charge of kitchens, laundries, steward's stores in general or Red Cross hospitals; also in private nursing homes, convalescent homes, in refreshment and rest stations. All three classes of women nurses may be usefully employed in the home territory; assistants should, however, only be employed under the supervision of a fully trained sister.

(c) From the day of mobilisation all female nurses are placed under the disciplinary control of the Imperial commissioner and military inspector of voluntary aid or their representatives in each area. All nurses employed outside the home territory are subject to military law.

Section VII.—*Dress and Equipment.*

(1) Sisters and assistant sisters of the Red Cross Society may wear the authorised uniform of the society; similarly sisters belonging to a religious order may wear the uniform of their order. The articles of clothing, identification tally and iron ration to be provided by each sister on mobilisation for service in the field are detailed in Appendix 3.

(2) Assistants, for whom no special dress is prescribed, are to wear a simple dress of dark stuff.

(3) In hospital a dress of washable material is to be worn; the hair is to be covered by a cap of similar material.

(4) While employed, nurses are to wear a Red Cross brassard stamped by the Imperial commissioner.

(5) A dressing case is issued to each nurse employed in hospital.

(6) Each nurse should provide herself with a small notebook, and if possible with a writing-pad and fountain pen to enable her to write letters for helpless patients.

Section VIII.—*State Privileges.*

(1) Nurses employed out of the home territory will receive daily pay as laid down in the pay warrant for war. Nurses employed in military hospitals in the home territory may receive pay if the Imperial Commissioner approves; the rate is determined by the Prussian Minister of War.

(2) All voluntary aid nurses, if employed away from their own homes, receive free rations and lodging.

(3) Voluntary aid *personnel* employed beyond the home territory are entitled to free medical attendance, and if necessary treatment in hospital. In the home territory this privilege is only allowed in very exceptional circumstances.

(4) In the event of injury or death while on service voluntary aid *personnel* employed beyond the home territory are dealt with under the same conditions as persons belonging to the regular forces.

(5) In the event of mobilisation the *personnel* of voluntary aid societies are carried free on the railways on producing the order detailing them to proceed to any place.

(6) When employed beyond the home territory they have the privilege of transmitting money by post without paying commission.

C. E. P.

**The Army Field Service School for Medical Officers, United States Army.**—The object of the Army Field Service School for Medical Officers is to prepare officers of the medical corps and medical officers of the militia for the better performance of their duties as administrative and staff officers on service, and to make research in subjects that concern medical officers under field conditions.

Students are selected from medical officers of the regular army, who are recommended by the Surgeon-General of the Army. Not more than eight regular and six militia officers are allowed to attend each course.

The syllabus of work is arranged under the following departments:—

The department of the care of troops.

The department of military art.

The department of engineering.

The subjects included in the syllabus are given in the Appendix.

The course of instruction includes lectures, conferences and problems.

Student officers of the Army Field Service School for Medical Officers and the medical units located at Fort Leavenworth are employed with the officers under instruction at the other service schools during manœuvres, staff, and tactical rides.

The academic board, at the conclusion of the course, reports upon the qualifications of each student officer. These reports are forwarded to the War Department, and inserted in the personal record of the officer concerned.

#### APPENDIX.

##### *Syllabus of Work.*

(I.) Department of the care of troops.

(a) Duties of the medical department in the field; general sanitary organisation, functions of administrative medical officers; sanitary equipment; transport; range of weapons, percentages of casualties; Red Cross and voluntary aid associations.

(b) The civil functions of the medical department in the occupied territories.

(c) Schemes for the organisation, equipment, and supply of the medical department in the field.

(II.) Military art.

Organisation and administration of troops in the field; orders; elementary principles of tactics; staff administration and supply.

(III.) Engineering.

(a) Military topography, map reading, and the use of military maps.

(b) Sketching, simple road and position sketches.

C. E. P.

**Convalescent Home for French Troops Serving in Algeria.**—In *Le Caducée* of April 2nd, 1910, Dr. Ravenez gives a description of the convalescent home at Eckmühl-Oran, which has been equipped and is

maintained by the "Union des Femmes de France," for the benefit of sick French soldiers of the 19th Army Corps.

The home was opened in December, 1908, and accommodates twenty-four patients; it is managed by a retired officer, who draws a salary of £48 per annum. One of the medical officers in garrison pays a daily visit. The diet is the same as that in the large military hospitals with some additions; each man receives 1½d. a day for pocket money. While in hospital the patients draw their ordinary pay and rations. The daily cost per head works out at a fraction over 9½d. The initial expenses incurred in fitting out the building were £400, while the annual upkeep requires £800.

C. E. P.

**Defective Vision and its Bearing on the Question of Fitness for Service** (Dr. Gonin, *Revue Militaire Suisse*, March and April, 1910).—Dr. Gonin begins with a general review of the conditions which are responsible for defective vision, with special reference to errors of refraction. He then proceeds to investigate the influence of defective vision on shooting. Among three companies he found forty-eight men whose vision on enlistment was noted as below normal. The musketry sheets of these men showed the following results:—

First group, men whose vision was equal to  $\frac{3}{4}$  or  $\frac{2}{3}$  of normal. During the recruits' course of musketry these men obtained an average of 79 points out of a possible 300; in the *Landwehr* course their average score was 90 out of a maximum of 240.

Second group, vision equal to  $\frac{1}{2}$  normal. These men scored an average of 68 points in the recruits' course and 65 in the *Landwehr* course.

Third group, vision equal to  $\frac{1}{3}$  normal. This group averaged 62 points in the recruits' course and 60 in the *Landwehr* course.

The average points scored in the *Landwehr* course by the forty-eight men of defective vision was 71, as against 104 by the remainder of the three companies.

Dr. Gonin then tried the effect on himself and others of wearing a concave or convex glass over the aiming eye while shooting at a target. He found that a myopia of more than 1.25D reduced the number of points scored to  $\frac{1}{3}$  or less; when both eyes were rendered equally myopic the results were much better. Artificial hypermetropia did not interfere with vision to nearly as great an extent as myopia. Artificially produced simple astigmatism not exceeding 1.25D had much the same effect as simple myopia.

The writer next points out that the Swiss regulations permit the use of glasses in the army, but that no provision is made for issuing these to men with defective vision. He then enumerates the many objections to enlisting men as soldiers who are dependent on the help of glasses for shooting, scouting, &c.

Dr. Gonin then describes his "lunettes de tir," a little instrument which he has devised to correct errors of vision, especially when shooting, and which he claims is not subject to the same objections as glasses. This consists of a spectacle frame in which one glass is replaced by a metal disc pierced with one or more holes, the diameters of which vary from 1 to  $1\frac{1}{2}$  or 2 mm. By rotating the disc the soldier can find which one suits him best, and looking through this hole he will find that he

can see the back and fore sights and targets much more clearly than with the naked eye. This apparatus can, however, only be employed successfully when the error in refraction does not exceed 2 or, at most, 3D. A myope of 3D using this apparatus sees as well as a myope of only 1½D; the smallness of the hole has the disadvantage of making the target look dull, hence it must be well lighted. The side pieces of the spectacle frame are fastened together at the back of the head with a piece of elastic tape, so that the man can push them up or down without having to remove them.

For some years men were enlisted with good vision in the left eye only, but this was stopped at the request of the instructors of musketry, which Dr. Gonin thinks is a pity, as many men are able to shoot well from the left shoulder, but are not at present accepted for the infantry.

Dr. Gonin then enumerates the standards of vision required in recruits for various arms of the service.

*Infantry.*—The recruit must possess  $\frac{3}{4}$  vision in the right eye without glasses, or after the correction of myopia or hypermetropia of not more than 4D.

*Cavalry.*—At present the recruit need only possess  $\frac{1}{2}$  normal vision, which Dr. Gonin thinks is too low.

*Artillery.*—The standard required is 1 by Snellen's types. Dr. T. Gonin thinks that gun layers should possess at least 1½ by Snellen's types in one eye, but that it is immaterial which eye is the best; the remaining personnel of the battery should have normal vision in each eye.

*Machine Gunners.*—Dr. Gonin thinks that these men should possess perfect vision in both eyes, on account of the enormous expenditure of ammunition which they control; their hands being occupied they cannot attend to glasses should they be permitted to wear them.

*Engineers.*—The standard is  $\frac{1}{2}$  vision, which Dr. Gonin thinks is sufficient, as they are mostly employed on technical work.

*Departmental Corps.*—Men of these corps need only possess  $\frac{1}{2}$  vision in one eye, with which Dr. Gonin is satisfied.

*Enrolling of Recruits.*—Dr. Gonin makes the following suggestions:—

(1) That all men enlisted should be obliged to supply themselves with glasses, provided an ophthalmic surgeon states that these should be worn in civil life.

(2) Where a man cannot in fairness be made to purchase glasses, he should be provided with Dr. Gonin's metal "lunettes de tir," and if his vision, with the aid of these, is equal to or better than  $\frac{1}{2}$ , he should be assigned to the infantry.

(3) That the men should not be definitely assigned to the corps until the medical examination of the whole district has been completed, and that then the best men, having special regard to the quality of their vision, should be selected for scouts, machine gunners, and layers in the artillery.

C. E. P.

**Marching, Equipment on the March, and Suggestions for Lightening the Latter.**—(Marschleistungen, Marschausrüstung, und Marscherleichterungen). By Major von Schreibershofen. *Jahrbücher für die Deutsche Armee und Marine*, February and March, 1910 (Abstract).

This paper seems to have been prompted by certain proposed reductions in the weight carried by the French infantry soldier. The author begins by pointing out that on service marching may be looked on as the daily bread of the soldier, whereas fighting is merely an occasional luxury. There are numerous instances in history where efficiency in marching has been the deciding factor in a campaign. This point is insisted on in much the same words in the German Field Service Regulations. With the enormous growth in the size of modern armies, it will be necessary to place entire army corps, occasionally even more than one army corps, on a single road, and the great depth of the column thus formed will entail tremendous exertions on the part of the troops at the rear of the column if they are to arrive at the front in time for an anticipated engagement. Falkenhausen, in his "*Grossen Krieg der Jetztzeit*," anticipates that in the event of war with France, 25 army corps and 14 reserve corps will be massed between Wesel and Strasburg, a distance of about 220 miles. (The strength of a German army corps is 38,058 men and officers, with 11,083 horses, 144 guns, and 1,714 other carriages; so that the 39 corps mentioned above imply a collection of upwards of one and a half million men, and over 400,000 horses—that is, 6,700 odd men and nearly 2,000 horses per mile of front. The mere addition of so large a population to an already inhabited district must give food for much thought to sanitarians.—C. H. M.)

A company on war footing consists of only one-third active list men and two-thirds reservists. The physical quality will therefore be very uneven, and the general value will be that of the weakest men. It will be out of the question to save the weaker men at the expense of the stronger, and the same applies to the comparatively untrained reserve corps. It will be impossible to spare these entirely, and they may suddenly be called on for greater exertions than any other corps.

The steady drift of the population to the towns is a serious matter in this connection, and a general encouragement of sport and games, or compulsory physical training, seems the only remedy. The townsman is, as a rule, comparatively weak, physically, often unsound, and unaccustomed to severe exertion. He is likely to suffer to a greater extent than the country lad from exposure to inclement weather and change of diet, combined with severe and unwonted exertion. Such men, it must be remembered, form the bulk of a modern army. Increased prosperity and luxury must also be looked on as a detrimental factor.

Other causes, the effect of modern conditions, increase the disadvantages of the soldier of the present day. In former times armies were always on a war footing, and the march to the seat of war was a matter of weeks. Thus the weakly men were weeded out before the enemy was met. Nowadays the men are hurried through the preliminary stages, and they have but a few days to get accustomed to marching and carrying their kits. Consequently the weeding out of the "crops" will not occur before the earlier battles of the campaign, whilst the decisive effect that these engagements will have on the subsequent course of events will necessitate even greater demands being made on the men at the very commencement of hostilities. The author concludes that whilst on the one hand the conditions of modern warfare will increase enormously the exertions called for from the infantry soldier, the effects of

our present-day civilisation is to make him less able to endure the strain. Everything, therefore, that can increase the marching power of the man must be sought for, and everything that may possibly diminish it avoided.

One of the most important factors is the weight of the equipment carried by the man. The greater the weight carried, the less the distance covered in the same space of time, and the less fit the man is to march, and fight at the end of the march. The strength of the average individual cannot be increased—therefore, if increased marching power is required, it must be sought for by reducing the weight of the equipment. Von Moltke recognised this as far back as 1860; now that France has taken a definite step in this direction, it is time to re-open the question.

In considering any lessening of the weight of the knapsack, it must be remembered that the soldier has to carry on his own back all that he really wants. He must be able to feed himself, shelter himself, go equipped into action, be able to throw up cover, and dress his wounds. So many conflicting claims are present on the part of the different authorities concerned in the feeding and tending of the soldier that a decision that is to reconcile them must come from superior authority. The uniform cannot be altered, since it is already in stock, and all prepared for issue. The rifle is also a fixed quantity.

As regards ammunition, modern war demands a greatly increased expenditure of cartridges, and though the fact that they are individually lighter enables a larger number to be carried for the same weight, this is not sufficient. The weight of the cartridges is a very serious matter, and though any decrease in the number carried by the man is sure to meet with much opposition, it is in this direction the author considers that relief should be sought. It must be remembered that a man has to carry his ammunition for many days before he uses it, and that the days in a campaign during which he is firing for hours at a time are few indeed, compared with those on which he is marching. As it is, a certain portion of the number of rounds have to be carried on the company ammunition carts, which keep in close touch with the unit, and serve out their contents on the approach of an engagement. It is only to go a step further in this direction to take even a greater proportion off the man, and place it on the cart. Unfortunately the present cart is loaded up to its limit already, and can take no further increased weight; the corollary is that the number of carts must be increased. There will be much opposition to this, as tending to lengthen the column of march. The question is, therefore, whether it is more important to lighten the kit or shorten the length of the column. The author suggests marching in six ranks instead of four. This would shorten the column by one-third, and provide the necessary space. (This proposal cannot be accepted as sound on physiological grounds. The centre men, in a column marching six abreast, especially if at all far back, would undoubtedly suffer terribly from heat. Such a proposal would lead inevitably to a great increase in the number of cases of heatstroke, and the men who escaped this would undoubtedly suffer more from exhaustion, due to overcrowding on the road, than they would gain by the reduction in the weight.—C. H. M.) The author further suggests lightening the bayonet, present weight 580 grammes, and carrying the entrenching tools in the regimental transport.

As regards rations, it might be possible to make use of the field

portable kitchens to relieve the man of some of the weight of these, and still have three days' rations conveniently close at hand. Mess-tins must be retained for use by detached parties, for cooking in, and also for carrying cooked rations.

(The present German mess-tin is an excellent pattern, made of aluminium, blackened to render it less conspicuous. It weighs only  $13\frac{1}{4}$  ounces, and has a capacity of  $4\frac{1}{2}$  pints. The Austrian tin weighs  $2\frac{1}{2}$  lb. nearly, and has a capacity of  $5\frac{1}{2}$  pints. The French *Gamelle individuelle* weighs about 1 lb., and holds  $2\frac{1}{2}$  pints; our own weighs over  $1\frac{1}{2}$  lbs., and has a capacity of under  $2\frac{1}{2}$  pints.—C. H. M.)

The author is in favour of retaining the greatcoat, on the grounds that one never knows when it may or may not be wanted, even in the summer. If left behind it would be impossible to forward it if wanted in an emergency. (This is a point on which not every one would agree with Major von Schreibershofen. The greatcoat in ordinary use in modern armies is a cumbersome article of clothing. The following are the weights of the coat in different services: British, 7 lb.; French, 5 lb. nearly; German,  $3\frac{3}{4}$  lb.; Austrian, 6 lb.; United States "slicker," 6 lb.; Italian,  $4\frac{1}{2}$  lb. It is noteworthy that the Norwegians, who presumably calculate for service in a cold climate, do not issue any greatcoat, but substitute for it a thick "sweater" and a sleeping bag. The essential vice of the ordinary greatcoat is that it is long enough to hamper seriously the movements of the wearer, but not sufficiently ample to shelter his lower extremities when asleep. The coat, warm (British), issued in India, with a detachable skirt or long kilt, would be preferable.—C. H. M.)

Major von Schreibershofen would do away with the shelter tent (carried practically by all armies except our own.—C. H. M.). He admits that it is popular with the men, and well designed, besides being useful on manœuvres when it is desired to avoid billeting. In war-time, however, he points out that the soldier would have to be put under a roof whatever the inconvenience to the civilian, and that the experience of well-trained men on manœuvres who have not to carry ball-cartridge, nor, as a rule, the iron ration, is not an absolutely safe guide to the realities of war. He considers that as the German soldier went through the Franco-German War, in spite of the severity of the winter, without a shelter tent, there is no reason to suppose that he could not do the same in the next war. (The average weight of a shelter tent is considerable. French  $2\frac{1}{4}$  lb., German over 3 lb., Austrian  $2\frac{1}{4}$  lb., American  $4\frac{3}{4}$  lb., Norwegian over 3 lb., Italian over 3 lb. A considerable saving is possible, therefore, in this direction. The experience of the British Army, one certainly not lacking in climatological variety, would tend to point to the tent being a luxury.—C. H. M.) The author is not in favour of the long German boot, weight 4 lb. (It is stated, by the way, in Munson's "Military Hygiene" that the nails in these boots are of aluminium. This would appear not to be the case. An analysis made by Major Beveridge of a nail taken out of one of the boots in the museum of the College showed that it consisted practically only of iron.—C. H. M.) He would like to see lace boots with gaiters, the long boots being retained only for men accustomed to wearing them in civil life. (Chiefly the inhabitants of the Eastern provinces.—C. H. M.) Carrying a change of linen in the knapsack might be dispensed with, it only gets dirty there, and is a luxury. Cleaning materials might

also be cut down. A good deal might be saved by taking superfluous articles out of the Company cart, and replacing them by necessities that the man at present carries. The author is strongly opposed to leaving knapsacks behind when going into action, and repeats Napoleon's maxim, in which the knapsack is included with the musket and ammunition as one of the belongings that a soldier must never be parted from. He mentions several historical instances where the results of doing so were unfortunate. Thus, at Mars-la-Tour, the 20th and 35th Infantry regiments had their packs looted. On the other hand, a French division at Gravelotte, two days later, was deprived of the services of two battalions and a battery, left behind as a guard over the knapsacks. In the case of retreat the men may lose everything they possess, as in the case of Frossard's Army Corps, who on August 6th, 1870, went into action leaving behind them their knapsacks, mess-tins, waterproof sheets, and tents, and suffered much during the retreat on Metz by being without these articles. On the same day Castagny's division, which had marched out in a wrong direction, returned to its original starting point to collect kits, and got so far separated from the rest of the force as to be unable to take any part in the engagement. The Japanese, it is true, followed this practice in the late war, and as a consequence were sometimes as long as a fortnight without their knapsacks, looking on this, however, as a lesser evil than being hampered by its weight in action. They used coolie transport, however, for forwarding kits thus left behind. The author is of opinion that in the earlier stages of a campaign it is justifiable, and advisable, especially if no immediate fighting is in prospect, to provide transport for men's knapsacks; this is less necessary at a later date when men have got into condition. This precaution was taken in 1870, in the case of the 8th and 10th Army Corps, when it was desired to push them forward rapidly. Of course this means a considerable increase in the transport. If these additional carts are to be kept close to the troops, then all previous calculations as to time taken, and road-space occupied, are thrown out, as indeed occurred in the case of the 1st and 2nd Guard Corps between August 23rd and 29th, 1870. On the other hand, if the transport is kept apart from the troops the men may be entirely deprived of their kits. In the case of the 10th Army Corps, already mentioned, the men did not see their knapsacks for a whole month, and as one of the regimental histories says: "Unless one can count on getting the packs back after two or three days, then what was intended as a relief results merely in increased hardship." As a matter of fact, such a measure is possible with small detachments of men only. In the case of large bodies of troops the disadvantages more than counterbalance the anticipated advantages. In any case, if the knapsack is left behind the soldier must still keep his greatcoat, shelter tent (this hardly agrees with the author's previously expressed opinion on this point.—C. H. M.), mess-tin, iron ration, cartridges, and entrenching tool. The equipment of the German Infantry soldier does not facilitate the separation of these articles from the rest of the equipment. (Other nations are in much the same boat, especially the Austrians. The British web equipment is superior to all others in this respect, with the exception of the extremely workmanlike outfit of the 1st and 5th Gurkhas.—C. H. M.)

This article raises a question of the greatest importance, not only to

medical officers but also to those connected more directly with the fighting efficiency of the army. The present system of personal equipment may be said to date from the early campaigns of the great Napoleon. Before his time there does not appear to have been any clearly laid down rule in this matter. The soldier carried what he could, and the baggage train "did the rest." As a result the former was apt to "go short" and the latter to be unduly prolonged. Napoleon, with a view to increased strategical mobility, instituted the modern system of personal equipment, thereby reducing his transport and making his column more independent. In his day it must be remembered strategy was governed by conditions of communication not much, if at all, superior to those which obtained in the days of the later Roman Empire. At the same time, tactical mobility had not the same significance, in view of the short range of musketry and artillery fire, that it possesses at the present day. The final stages of the attack were but little more prolonged at Waterloo than they were at Crécy or Agincourt. At the present day all this is reversed. Strategical mobility is largely a question of mechanical transport, whether that be limited to definite lines, as in the case of railways, or free to move on any road, as with motor-cars, bicycles, not to speak of aerial carriage. On the other hand, tactical mobility is of overwhelming importance. The infantry soldier must be prepared to perform repeated rushes over broken ground, often in themselves of considerable length, and demanding in the aggregate extraordinary powers of resistance.

It must be obvious to anyone who has seen the collection of foreign equipments in the museum of the College that to ask the average reservist, fresh from the counter or the desk, to face such exertion, is to demand an impossibility. Something must be done. Rifle, ammunition, entrenching tool, water, and food for forty-eight hours he must carry. The problem is how little else can he retain efficiency on? The above articles, including personal clothing, amount to little short of 40 lb., and every pound above that is a "penalty" weight. It is open to question whether we have not been too much afraid of exposure. The healthy young man can probably better support two or three nights in the open, unsheltered, as long as he is well fed, than he can, especially if untrained, bear the weight of a heavy or badly arranged equipment, on a long march, or through a long-drawn-out attack. There is a footnote in an early addition of "Parkes"<sup>1</sup> which is worth recalling, bearing on this very point. "I have seen a letter from a Prussian officer, high in rank, and certain to know the fact, stating that the difference in health of the Prussian soldiers who carried the knapsacks in the Bohemian marches in 1866, and those who did not, was remarkable. The men who had not carried their packs, though they had not had the comforts of their necessaries, were fresh and vigorous, and in high spirits; those who carried them, on the other hand, were comparatively worn and exhausted. And this was with the best military knapsack then known." The problem is one that demands close attention by medical officers.

C. H. M.

<sup>1</sup> Parkes' "Practical Hygiene," de Chaumont, 5th edition, p. 583.

**The Provision of Pure Drinking Water for the Individual Soldier.**

By Regimentsarzt Dr. Glaser (*Militärarzt*, February 25th, 1910).—The author gives a review of the different means employed for supplying an army with pure drinking water. He considers that the problem of sterilising water for large numbers of men has been fairly well solved by the use of heat sterilisers and other apparatus, but that the case of a single man or small party necessarily detached, and so unable to procure their drinking water from a sterilising apparatus has not been sufficiently considered.

Glaser thinks that for individuals some form of chemical sterilisation must be used, and after carefully considering the merits of each has decided in favour of the use of calcium permanganate followed by sulphate of manganese, as this process, while efficiently sterilising the water, does not impart any objectionable flavour. At first these reagents were put up in "tabloid" form, but as these often did not completely dissolve their use was abandoned in favour of concentrated solutions.

The apparatus recommended by Glaser consists of a round aluminium case, 2 inches long and  $1\frac{1}{4}$  inches in diameter; this carries two drop bottles, each having a capacity of twenty-five drops, one of which is filled with a concentrated solution of calcium permanganate, and the other with a similar solution of sulphate of manganese, and a supply of filtering discs. The case is closed by a screw top at one end, the other end is made to screw into the neck of the man's water-bottle.

The method is used as follows: One litre (35 ounces) of the water to be sterilised is poured into the man's mess-tin, and five drops (containing 50 milligrammes of the salt) of the calcium permanganate solution is added and thoroughly mixed; after standing for ten minutes, five drops of the sulphate of manganese solution is added and well mixed. In about ten minutes a brown precipitate is formed. A sterile filtering disc is then placed over the mouth of the water-bottle, the aluminium case is screwed in and the water filtered into the water-bottle. To test the efficiency of the process typhoid cultures were mixed with water and treated as described above; culture tests showed the water to be sterile.

C. E. P.

**Cantonment Sanitation**, by Lieutenant-Colonel W. A. Morris, R.A.M.C., a paper contributed to *Indian Public Health*.—In this paper Lieutenant-Colonel Morris discusses the question of conservancy in Indian Cantonments. He compares the working and results obtained by (a) the dry-earth system, (b) the wet system, (c) incineration. The danger to the community arising out of the dry-earth system is briefly referred to; the difficulty, and in many stations during the rainy season, the absolute impossibility of carrying out incineration, is clearly pointed out. Lieutenant-Colonel Morris is entirely in favour of the wet system carried out as follows:—

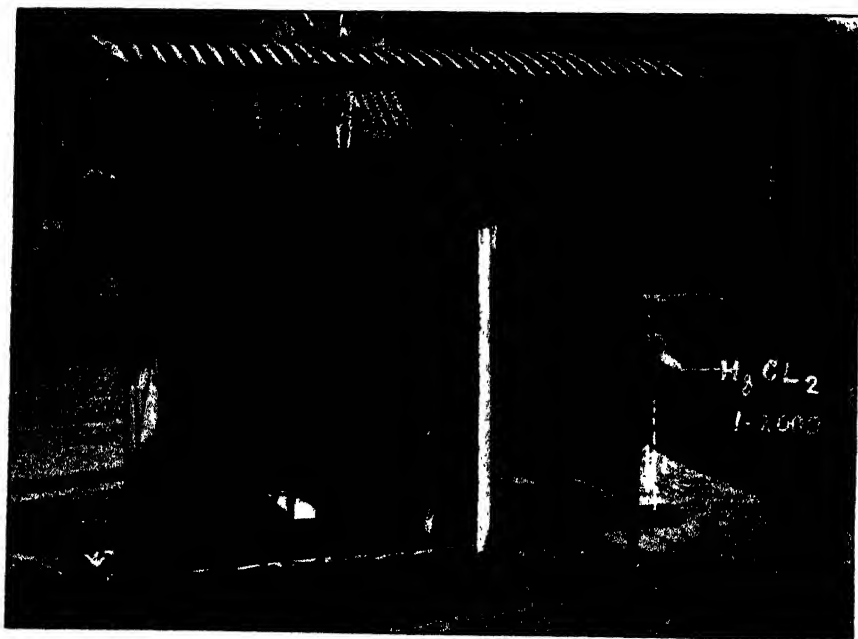
The antiseptic solution used is perchloride of mercury of a strength of not less than 1 in 2,000; this is kept in earthenware jars at the back of each latrine, together with a syringe of  $\frac{1}{2}$  pint capacity, by means of which some of the solution is withdrawn from the jar and placed in the latrine pans; the whole latrine is also syringed over once a week with the solution. An iron skewer is also kept beside the solution. This is used by the sweeper to break up any large mass of faecal matter

and so let the solution get into fairly intimate contact with the whole of the excrement. When properly attended to there should be no smell in the latrine.

Lieutenant-Colonel Morris's figures, showing the incidence and mortality from enteric fever during the periods when the dry earth, the wet perchloride, and incineration methods were employed, certainly show an enormous reduction in the incidence and mortality from enteric fever during the perchloride *régime*. Thus, in Cawnpore, which has a bad reputation for enteric fever, there was not a single case of this disease during a period of one year and five months. Lieutenant-Colonel Morris modestly only claims half of this striking success for his improved conservancy arrangements, the other half being equally divided between anti-typhoid inoculation and the zeal of the medical officers in sanitary charge of the barracks.

The photograph shows a native latrine adapted to Lieutenant-Colonel Morris's wet system.

C. E. P.



The "stone" latrine for Indian lines, cantonments and bazaars, adapted to the mercuric chloride wet method. Solid dejecta are received in a pan containing the solution; urine passes into the trough into which the solution continually drops, and flows from right to left in the direction of the arrows.

**Beri-beri in Cochin-China.**—In the *Annales d'Hygiène et de Médecine coloniales*, No. i., of 1910, Dr. Thézé describes his experience

in the treatment of beri-beri. He came to the conclusion that the diet given in the prison of Poulo-Condore was deficient in mineral salts, especially phosphates. An analysis of 700 grammes of white rice showed that this only contained 1.56 gramme of phosphates, whereas a similar quantity of red rice, *i.e.*, rice which had not been completely decorticated, contained 2.75 grammes of phosphates. Dr. Thézé believes that this fact explains the beneficial effect of partially decorticated rice, both as a prophylactic and curative agent in beri-beri.

The editor of the Journal adds an interesting note showing the effect of substituting "red" rice for white rice in the diets of native prisoners at Saigon. Up to the end of October, 1903, white rice was issued. During this time about 13 per cent. of the prisoners died annually from beri-beri. From November, 1904, to the end of 1907, red rice was used; during this period the mortality from beri-beri fell to between .4 and 1.7 per cent.

In the prison at Poulo-Condore a similar change in the diet was made in August, 1906. During the preceding five years the percentage of deaths due to beri-beri varied between 7.6 and 57.4 per cent. In the two and a half years following the change of diet there was not a single death from beri-beri in this prison.

In view of the above French experience in Indo-China, it is worth referring to Gilmore Ellis's experience (*British Medical Journal*, October 2nd, 1909) in the lunatic asylum and beri-beri hospital at Singapore. Using "uncured" rice, more than half the deaths in the asylum were due to beri-beri. By substituting "cured" rice beri-beri was banished. The method of curing employed by Ellis was as follows: The rice was soaked in water for forty-eight hours and then steamed for a few minutes till the grains burst; it was then husked in a mill in the ordinary way.

At the January meeting of the Société de Pathologie Exotique,<sup>1</sup> M. Bréaudat read an important paper on the causation and prevention of beri-beri. He believes that beri-beri is caused by a vibrio ferment which inhabits swamps and rice-fields, and that when ingested this vibrio ferment sets up an acid fermentation in the intestinal canal leading to auto-intoxication and the condition known as beri-beri. He also says that the envelope of the grain of rice has a powerful prophylactic and curative action. His principal conclusions are as follows:—

(1) All animals fed exclusively on cooked white rice contaminated with the vibrio ferment die sooner or later; death is hastened if intestinal parasites are present.

(2) Animals fed on the same rice with the addition of rice bran, *i.e.*, with the coverings of the grain which lie between the pericarp and the albumin, resist the poison indefinitely.

(3) Animals artificially infected by feeding on contaminated cooked rice recover when given rice bran, provided the disease had not progressed too far.

(4) Beri-beri is extremely rare among the peasants of Annam, who only roughly husk their paddy by hand when it is actually required for food; the grain is thus not exposed to contamination, and contains a large proportion of bran.

(5) Endemic beri-beri has been eliminated from the prisons and barracks of Cochin-China by substituting paddy, husked daily as required, for the prepared rice supplied by factories.

Beginning in March, 1909, every patient in the three native hospitals at Saigon was given with each of the three daily meals, a bolus prepared as follows:—

Fresh commercial rice bran passed through sieve No. 60	..	100 grammes.
Simple syrup .. .. .	..	60 "
Essence of peppermint .. .. .	..	1 cc. "

Make into a pill mass, and divide into ten boluses, each weighing 16 grammes.

No change was made in the dietary, nor was any medicine given internally. The results were as follows:—

Hospital at Phu-My: During the period prior to March 1st the deaths were 24·3 per cent. of the admissions; from March 1st to December 2nd the death-rate was 4·2 per cent. of the admissions. The corresponding figures for the hospital at Chalon were 27·4 and 7; for the hospital at Choquan, 23·9 and 2·8.

In June, 1909, the following experiment was tried:—

At Cap Saint Jacques, where beri-beri was extremely prevalent, the 500 riflemen and 200 artillerymen were divided into two groups; to one of these 40 to 50 grammes of rice bran was given as a prophylactic with each of the principal meals. According to the latest available figures the men in this group had only furnished six cases of beri-beri, while in the other group seventy-one cases had been reported. All of these cases were treated as out-patients with rice-bran and recovered.

C. E. P.

## Correspondence.

### MIDDLE-EAR DISEASE IN THE ARMY.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I am glad to see further attention drawn to the above subject in your last issue. From the figures quoted by Captain Burke, it would appear that fifty out of sixty-three men had under eighteen months' service, and the great majority were probably enlisted with the disease.

The first point which I think should be considered is what percentage *can* be detected by the rough-and-ready methods adopted at recruiting depôts?

From personal experience during the past three weeks, I am in a position to state that out of 258 recruits examined, I found seven suffering from chronic middle-ear disease, and one from severe inflammation of external meatus = 3·1 per cent. of rejections.

The method adopted is as follows :—

(1) Inspection after pulling up the pinna opposite a good light. If I can see a plug of wax, or a considerable amount lining the wall of the canal, I feel satisfied that no discharge exists. So far as I can remember, I have never seen wax in any quantity associated with a chronically discharging ear.

(2) If all appears correct, I make the man blow out his drums. By watching the distension of the external jugular veins, one can test the expiratory effort. If no noise is heard, I *assume* there is no perforation; but this test is, of course, by no means infallible.

(3) If the canal is wet and free from wax, I smell the orifice. The odour of a discharging ear is quite characteristic. I then mop out the canal by cotton-wool rolled on a match, and verify the diagnosis by Brunton's auriscope.

This is all one can do in the time, and I am quite prepared to believe that an occasional case may remain undetected.

My second line of defence would be, *not* an aural specialist, but the Medical Officer in charge of the dépôt to which the man is sent.

He should be compelled *by regulation* to have the recruit's ears syringed, and then examine them with a speculum, recording the condition of the tympanic membranes and acuteness of hearing on the medical history sheet. Standard watches should be supplied for this purpose. I hold that any Royal Army Medical Corps officer is quite capable of making an examination by speculum, and nothing more is required.

By this means we should not have to keep men from one to twelve weeks before finding out the presence of chronic ear disease.

From the aural specialist's point of view, it would be very nice to have a special ear department in every large military hospital; but, knowing what *lame ducks* these chronic ear cases are, I think the best and cheapest course to adopt would be as suggested in a previous communication—viz., under eighteen months, invalid ruthlessly; after eighteen months and over, send to Army Reserve, for home defence only.

I imagine that in the present day no medical officer would knowingly allow a chronic ear case to go abroad or on active service.

I am, &c.,

Stratford, E.,  
October 8th, 1910.

F. J. W. PORTER,  
Major R.A.M.C.

Journal  
of the  
Royal Army Medical Corps.

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Original Communications.

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EXPERIMENTS TO ASCERTAIN IF CATTLE MAY ACT  
AS A RESERVOIR OF THE VIRUS OF SLEEPING-  
SICKNESS (*TRYPANOSOMA GAMBIENSE*).<sup>1</sup>

By COLONEL SIR DAVID BRUCE, C.B., F.R.S.,  
CAPTAINS A. E. HAMERTON, D.S.O., AND H. R. BATEMAN,  
*Royal Army Medical Corps*;  
AND  
CAPTAIN F. P. MACKIE,  
*Indian Medical Service.*

THE question as to whether cattle can act as a reservoir of the virus of sleeping sickness is an important one. It was usually believed until lately that man was the main reservoir, and that the other animals might be ignored. But in view of the fact that the flies on the Lake-shore have remained infective for some two years after the native population have been removed, it is necessary to inquire if it is not possible that other animals may act as well.

In this regard cattle have been, perhaps, the most important, as on the once thickly populated Lake-shore and islands they were numerous, and in many cases grazed and watered in the fly-area. Another reason of their importance is, that if they can act as a reservoir, then the same will probably be true of the different species of antelope which inhabit the Lake-shore. It may be presumed that these will greatly increase now that the natives and domestic animals have been removed, and that they will take the

<sup>1</sup> Reprinted from the *Proceedings of the Royal Society*, B., vol. lxxxii., 1910.

place of the cattle in keeping up the infectivity of the *Glossina palpalis*.

The Commission, therefore, thought it would be well to inquire into the question, and the result is given in this paper.

Answers to the following questions were sought: Are cattle capable of being infected with sleeping sickness by the subcutaneous injection of blood containing *Trypanosoma gambiense*? Can cattle be infected with sleeping sickness by the bites of artificially infected tsetse-flies? Can cattle be infected with sleeping sickness by the bites of the naturally infected flies caught on the Lake-shore? Is it possible to infect tsetse-flies by feeding them on cattle infected with sleeping sickness, and afterwards to transmit the disease by means of these flies to healthy animals? Finally, if these questions are answered in the affirmative, will it be possible to find that cattle which have lived in the fly-area are naturally infected with sleeping sickness?

I. *Are Cattle capable of being Infected with Sleeping Sickness by the Subcutaneous Injection of Blood containing Trypanosoma gambiense?*

Experiment 869. Bull.

September 10th, 1909.—A bull was inoculated with 5 cc. of blood containing large numbers of *T. gambiense* from an infected monkey.

Its blood was examined daily, and 18 days after injection the bull was found to be infected with *T. gambiense*. The identity of the trypanosome was established by injecting a monkey with some blood from the ox. This monkey showed *T. gambiense* on the sixth day.

*Conclusion*.—From this experiment it is seen that oxen are capable of being infected with sleeping sickness by the injection of blood containing *T. gambiense*. The trypanosome appears in small numbers in the blood, and the blood, when injected into susceptible animals such as monkeys, gives rise to a fatal form of the disease.

II.—*Can Cattle be Infected with Sleeping Sickness by the Bites of Artificially Infected Glossina palpalis?*

The two following experiments were carried out by feeding *G. palpalis* first on an infected monkey, and immediately afterwards on a healthy ox. Wild flies from the Lake-shore were used.

Experiment 890. Ox.

May 20th, 1909.—The ox was thrown and a monkey heavily infected with sleeping sickness was laid across its flank. Two cages of *G. palpalis*, containing 100 and 150 flies respectively, were allowed to feed for a few seconds on the monkey and then on the ox. The flies were allowed from 30 to 35 interrupted feeds on each animal every day. This was continued for 38 days, during which time 561 flies were estimated to have fed on one or other animal.

July 17th.—Fifty-eight days after the first infected feed *Trypanosoma gambiense* appeared in the blood of the ox.

The identity of the trypanosome was established by injection of the ox's blood into two monkeys. The first monkey was injected with blood from the ox 76 days, and the second monkey 181 days after the flies had first fed on the ox. Both monkeys developed sleeping sickness, the first 7 days and the second 11 days after injection of the blood.

Experiment 891. Calf.

The details of this experiment were similar to those of the last. *T. gambiense* appeared in the blood of the calf 57 days after the flies had been first fed upon it.

Three cubic centimetres of the blood of the calf were injected into a monkey, and the monkey developed sleeping sickness after an incubation period of 8 days.

*Conclusion.*—These two experiments show that when artificially infected *G. palpalis* are allowed to feed on healthy cattle, these animals develop sleeping sickness, and that the blood of the cattle is capable of giving rise to infection of *T. gambiense* in monkeys when injected into them.

III. *Can Cattle be Infected with Sleeping Sickness by the Bites of the Naturally Infected Flies caught on the Lake-shore?*

In the next three experiments freshly caught *G. palpalis* brought up to the laboratory from the Lake-shore were allowed to feed straightway on healthy cattle. By this means it will be shown whether *G. palpalis* in their wild state are capable of giving sleeping sickness to healthy cattle.

Experiment 982. Bull.

2,195 freshly captured *G. palpalis* were applied to a bull, and of these 1,536 were estimated to have fed. This feeding of the flies

## 656 *Experiments with the Virus of Sleeping Sickness*

extended over a period of 16 days, at the end of which time *T. gambiense* appeared in the blood of the bull.

To help in the identification of this trypanosome, 3 cc. of the blood of the bull were injected into a monkey. The monkey developed sleeping sickness 18 days later. 5 cc. of the blood of the bull were also injected into a goat. *T. gambiense* appeared in the blood of the goat after an incubation period of 38 days.

### Experiment 1,462. Bull.

The details of this experiment were similar to those of the last one. Over a period of 8 days 1,370 wild flies from the Lake-shore were applied to the bull, of which 705 fed. Ten days from the first application of flies *T. gambiense* appeared in the blood of the bull.

Two animals, a monkey and a goat, each received 1 cc. of the blood of the bull by injection under their skin. The monkey developed sleeping sickness seven days later, but the goat died in 16 days without showing any infection.

### Experiment 1,465. Bull.

During a period of 13 days, 459 freshly caught Lake-shore *G. palpalis* were applied to a bull, and of these 314 fed. On the 14th day after the flies were first fed the bull developed an infection of *T. gambiense*.

Some blood from this bull was injected into a monkey and into a goat. Neither animal became infected.

*Conclusion.*—These experiments prove that *G. palpalis*, when captured in their natural state on the Lake-shore, are capable of transmitting the virus of sleeping sickness to cattle, and that the blood of these cattle gives rise to a fatal form of the disease in monkeys and in goats when it is injected into them.

## IV. *Is it possible to Infect Tsetse-flies by Feeding them on Cattle Infected with Sleeping Sickness, and afterwards to Transmit the Disease by means of these Flies to Healthy Animals?*

Five experiments under this heading were carried out. Laboratory-bred flies were used in all of them. Three were negative and two positive. The three negative experiments will be shortly summarised first.

### Experiment 1,451.

Ninety laboratory-bred *G. palpalis* were fed for 10 successive days on a calf whose blood contained *T. gambiense*. The flies were starved for 72 hours. They were then fed on a clean monkey daily

for 45 successive days. The monkey failed to develop sleeping sickness.

When the remainder of the flies were dissected, one contained flagellates, but when the contents of this fly were injected into a goat the animal failed to show any infection of *T. gambiense*.

*Result.*—Negative.

#### Experiment 1,269.

The details of this experiment were similar to those of the last. After the *G. palpalis* had been fed on two oxen whose blood contained *T. gambiense*, they were applied daily to a monkey. They were fed on this monkey for 35 consecutive days and were then transferred to a second monkey. Both the monkeys remained healthy.

Two of the flies were found on dissection to contain flagellates, but when these were injected into a monkey and a goat no development of sleeping sickness took place in these animals.

*Result.*—Negative.

#### Experiment 1,672.

Here again the technique was similar to the last. The *G. palpalis* were fed on alternate days for a lengthened period, on a clean monkey and a clean goat. Both animals remained healthy.

Some infected flies were found on dissection, but when introduced under the skin of a goat and of a monkey did not give rise to sleeping sickness.

*Result.*—Negative.

The next two experiments, which were carried out in the same way as the two preceding ones, were positive.

#### Experiment 1,566.

The *G. palpalis* were fed on an infected ox, and after a starve of 72 hours were fed on a clean monkey for 45 successive days. Sixty-eight days after the flies had taken their first infected feed this monkey developed sleeping sickness.

When the flies came to be dissected nine of them showed flagellates either in the proboscis or in the alimentary tract. Some of these were injected into goats and into a monkey, but with negative results.

*Result.*—Positive.

#### Experiment 1,602.

Fifty laboratory-bred flies were fed for four successive days on an ox whose blood contained *T. gambiense*. After a period of starvation they were applied to a monkey and to a goat on alternate days.

## 658 *Experiments with the Virus of Sleeping Sickness*

The monkey died before it could have become infected, but the goat developed sleeping sickness 20 days after the flies had their first infected feed.

The remainder of the flies, 32 in all, were dissected, and five were found to contain flagellates. The alimentary contents of one of these flies were injected into a monkey, and after an incubation period of 13 days *T. gambiense* appeared in its blood.

*Result.*—Positive.

*Conclusion.*—Laboratory-bred tsetse-flies can be infected by feeding them on cattle infected with sleeping sickness, and afterwards the disease can be transmitted to healthy animals by means of these flies.

### V. *Do Cattle, when Living in the Fly-area, actually carry the Virus of Sleeping Sickness?*

About seventeen cattle from various sources were examined with this point in view. Not all these cattle could be proved to have been exposed to the bites of *G. palpalis*, but most of them came from places where these flies are plentiful. One was positive.

#### Experiment 1,633.

This cow came from the island of Kome, in Lake Victoria, where human sleeping sickness is prevalent and where *G. palpalis* abound.

*T. gambiense* was found in its blood by microscopical examination, and when 3 cc. of the blood were injected under the skin of a monkey the animal developed sleeping sickness after an incubation period of seven days.

*Conclusion.*—This experiment proves that cattle in their natural state, and apparently in good health, may harbour the virus of sleeping sickness.

#### *General Conclusions.*

It has been proved by experiment that cattle may act as a reservoir of the virus of sleeping sickness, and that healthy animals may be infected from them by means of *G. palpalis*.

It has also been proved that cattle in the fly-area do naturally harbour *G. gambiense*.

It is, therefore, possible that the cattle and antelope living in the fly-area may act as a reservoir, and so keep up the infectivity of the *G. palpalis* for an indefinite period, but there is no proof up to the present that this actually takes place in Nature.

# MEDICAL HISTORY OF THE SOUTH AFRICAN WAR.

BY LIEUTENANT-COLONEL R. J. S. SIMPSON, C.M.G.

*Royal Army Medical Corps.*

*(Continued from p. 552.)*

## (7) *Individual General Diseases.*

*Small-pox.*—Cases, 10; deaths, none.

Small-pox of the normal type is common in South Africa among the natives, so common that, as already pointed out, its prevention is one of the two objects on which money is spent by the municipalities. There is also a disease prevalent among the native population—*amaas*—which is believed to be a modified small-pox, though opinion is not conclusive on this point.

The infinitesimal incidence in the field army needs no further comment; it sufficiently indicates the benefits of vaccination.

*Eruptive Fevers.*—Incidence 3·5 per 1,000.

*Measles.*—Cases, 1,218; deaths, 4.

This disease appeared among the troops (apart from isolated cases) towards the end of 1901. It is said to have been prevalent among the commandoes at the same time. It was comparatively localised in incidence. Lieutenant-Colonel Coutts makes the following remarks:—

“Measles appears to have prevailed among the Boers at various times during the war, and it is well known what havoc it wrought among the women and children in the refugee camps. An epidemic occurred among the Boer prisoners of war at Simon’s Town in the early part of 1900, it spread to the crews and guards on board the transports, and attacked a considerable number of the prisoners who were convalescing from enteric fever, and, by setting up broncho-pneumonia, often led to a fatal issue in such cases. The Medical Officer, Dr. Gerard Carré, expresses the opinion that the disease was brought by the prisoners from Cronje’s laager, where it was described to him as raging. The report of No. 6 Stationary Hospital at Green Point records the admission there of nineteen cases among the regular troops and ten among the Colonial troops, chiefly from the transports.”

*Scarlet Fever.*—Cases, 338; death, 1.

A small epidemic of a mild type occurred in the hot season, 1901-02. The cases were by no means typical, and the diagnosis was perhaps doubtful. There were a few sporadic cases elsewhere:

twenty-four were admitted to No. 7 General Hospital, Pretoria; eleven from the garrison, and thirteen sent in from the district. Lieutenant-Colonel Coutts remarks as follows:—

“A few stray cases of scarlet fever occurred here and there during the war, but the disease nowhere attained epidemic proportions, and was invariably of a benign type. It was probably imported at various times; some cases were admitted at Green Point from the transports, and two cases were treated at Kimberley in the early part of 1900, in men who had brought the disease from Cape Town. Seven cases were treated in No. 6 General Hospital at Naauwport, one of whom developed enteric fever when desquamating.”

*Plague.*—Cases, 24; deaths, 4.

Plague appeared among the natives near King William's Town in November, 1901; and in Cape Town in the following January, among the natives employed at the docks. From them it spread to the native, and later to the European, population of Cape Town.

The total cases reported by the Medical Officer of Health, Cape Colony, as *occurring in Cape Colony*, from the beginning of the epidemic to March 1st, 1902, was 877, of which 221 were Europeans, including those among the Imperial forces, 24. In the Cape Peninsula alone, 745 cases occurred, of which 192 were in Europeans, and 20 belonged to the Imperial forces.

The distribution was as follows:—

Green Point Camp ..	11	(close to the docks, the original focus).
Cape Town .. ..	5	
Maitland Camp ..	4	(close to Cape Town).
Herman .. ..	1	(both of these places were in constant communication
Port Elizabeth ..	1	with Cape Town).
On board ship ..	1	(between Cape Town and Durban).
Mafeking .. ..	1	(the only case among the troops outside Cape Colony).

The distribution in time was as follows:—

		Cases.			Cases.
March .. ..	9		June .. ..	2	
April .. ..	6		October .. ..	3	
May .. ..	3		February.. ..	1	(1902)

The preventive measures put in force followed three lines: (1) Cape Town ceased, as far as possible, to be a port of disembarkation of supplies. (2) Green Point Camp was evacuated as far as possible. (3) Movements from Cape Town were limited to what was absolutely necessary, and all troops passing up the line were systematically inspected at special halting places. (See also the Report on the Medical Arrangements in South Africa, p. 69).

The epidemic was, as shown above, mainly confined to the Cape Peninsula, but the immediate control of the supplies and movements of troops limited the development among the troops almost entirely to Cape Town and its vicinity.

*Dengue*.—Cases, 335 ; deaths, none.

This, a sudden epidemic, was practically confined to one column operating on the Natal-Zululand coast-belt in the hot season 1901-02.<sup>1</sup> There is, however, reason to believe that a smaller number of unrecognised cases had occurred on the northern border of Natal in the previous hot season, and some cases of a similar type occurred in the Eastern Province of Cape Colony. In all these instances glandular enlargements formed a prominent feature of the disease. The high infectivity and the sudden development of this disease may be a very serious matter in an isolated body of troops, such as the column mentioned, which was suddenly rendered temporarily useless. Protection against the mosquito (*Culex fatigans*) is, under the conditions of field service, a matter of very great difficulty; the only alternative is isolation of the earlier cases.

*Influenza*.—Incidence, 20·02 per 1,000.

This disease appeared as usual in "slight periodic epidemics," which were never of any importance. The Principal Medical Officer, No. 7 General Hospital, notes that these occurred "generally among men lately arrived in the country," that is, among those who may have introduced infection with them. Major F. Smith calls attention to the further complication in the early diagnosis of enteric fever by any such addition to the ill-defined pyrexias common on service.

Lieutenant-Colonel Coutts makes the following remarks :—

"Influenza is believed to have been introduced at various times during the war at the ports of disembarkation, and to have been carried up country by persons arriving in infected transports, but it seems probable, from an examination of the records, that a great many cases were diagnosed as influenza which were really cases of mild fever not influenzal, and that influenza, with simple continued fever, served to catalogue cases of fever of short duration, which could not be definitely assigned to enteric fever or other acute specific disease. The chief symptoms recorded are sudden invasion, severe headache, and fever of a few days' duration ; but

<sup>1</sup> For a full account, see Major Beveridge, D.S.O., JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. iii., p. 335.

there was a remarkable absence of that sudden and widespread incidence of the disease on whole communities, which has been so often observed, and an equally remarkable absence of catarrh of the naso-pharyngeal and bronchial mucous membranes, and of pneumonic sequelæ. The Medical Officer of No. 6 Stationary Hospital, Green Point, records the fact that a certain number of the cases were followed by considerable and persistent debility, which necessitated a change to England; and Dr. Carré states that the disease, together with enteric fever and measles, prevailed in epidemic form among the prisoners of war at Simon's Town, and spread to the guards on board the transports. It attacked men suffering from enteric fever, and thus increased the gravity of the prognosis. He expresses the opinion that it was brought by the prisoners from Paardeberg, but this is doubtful, as it was not observed among them at Modder River, where they remained several days before being despatched by rail.

"The report of No. 19 Stationary Hospital records 370 admissions for influenza, and states that they occurred chiefly between August and November. The disease 'was unlike European influenza, and was not infectious; it was characterised by fever of irregular character lasting from two days to two months; the symptoms were as a rule mild and nondescript in character—head-ache, neuralgic pains in various parts, depression, and sometimes gastric disturbance. There was no rash, and occasional bronchitic signs the only complication.

"The blood serum did not give Vidal's reaction with Malta fever micrococci, or typhoid or colon bacilli, and it is presumably an unclassified disease peculiar to the country; 222 cases of influenza were under treatment in No. 10 General Hospital, Bloemfontein, in 1900, 194 being direct admissions and twenty eight transfers. The registrar of this hospital, Major Freeman, states that the majority of the direct admissions occurred in September and November, 1900, when influenza was epidemic in Bloemfontein. He found a close relationship between the incidence of influenza and rheumatism and sore throat (including tonsillitis) and is inclined to think that some of the cases diagnosed rheumatism, sore throat or tonsillitis, should have been returned influenza. He also notes that influenza was apt to be followed by debility out of all proportion to the severity of the antecedent disease. Thus twenty of the 194 direct admissions were invalided to the base.

"We have only been able to find one case of fatal pneumonia attributed to influenza, and it occurred in No. 3 General Hospital, Kroonstad."

It is of course the case that everywhere influenza is used as a convenient term to indicate a short pyrexia of indefinite nature and uncertain origin. Probably this will always be the case. With regard to the relationship between the incidence of influenza, rheumatism, and sore throat noted by Major Freeman, this is well marked in our statistics in this country, but there is nothing to show that this relation is more than can be accounted for by the laxity in diagnosis of these minor symptom complexes.

*Diphtheria*.—Cases, 32; deaths, 2.

Diphtheria is relatively common throughout South Africa, not only in the towns, but on the farms, hence a greater number of cases might have been expected. Antitoxin was used where possible, as in the large general hospitals. "At No. 17 Stationary Hospital, Middelburg, two cases of pharyngeal diphtheria occurred as a complication of enteric fever" (Smith).

*Mediterranean Fever*.—Cases, 35; deaths, none.

One well-marked case occurred in an officer from Modder River, three months after leaving Malta. He may have shown an unusually long incubation period, or the attack may have been a severe relapse after an ephemeral and unnoticed first attack. He made a good recovery.

Through the work of Lieutenant-Colonel C. Birt and of Dr. Strachan, of Philipolis, Orange River Colony, it is now known that Mediterranean fever exists in endemic form in the south-west of the Orange River Colony. In Bloemfontein in 1900, Civil Surgeon Dodgson obtained a positive Widal reaction in several cases. But there is no evidence that the prevalence during the campaign was materially greater than these numbers reveal. During the five years 1903 to 1907, the prevalence in South Africa was only 0·4 per 1,000.

*Septic Diseases*.—Incidence, 1·21; mortality, 0·07 per 1,000.

	Cases.				Deaths.	
Erysipelas .. ..	496	..	..	..	12	..
Pyæmia .. ..	19	..	..	..	9	..
Septicæmia .. ..	18	..	..	..	6	..
Tetanus .. ..	6	..	..	..	3	..

These figures speak for themselves.

*Tubercular Diseases*.—Incidence, 2·89; mortality, 0·25 per 1,000.

	Cases.		Deaths.	
Tubercle of lung .. ..	1,088	..	87	..
Other forms .. ..	194	..	23	..

Three points may be noted here, first, that although all the men had been examined for active service, yet it is known from personal experience that some men (of the Reserve) had been sent out

though suffering from (and in one case under treatment in hospital) tubercular disease, "for the benefit of their health." Further the usual examination for fitness for active service is rarely carried out under such conditions as to permit of the detection of early cases without obvious signs, where, too, no assistance is to be obtained from the man in the matter of a history. Next, since the war, a few cases, officers and men, have occurred of invalids in whom the disease appears to have first become evident during the campaign, if the evidence is indeed not strong enough in every case to show that it was actually contracted at that time. Lastly, as already mentioned, the mortality was probably affected by the rapid invaliding of all cases.

"The influence of an open-air life in a dry climate even under the strain of severe conditions is nowhere more eloquently set out than in the medical report of the war" (Smith).

Lieutenant-Colonel W. J. MacNamara notes that many of the men in the Irregular Corps (South African Colonials) had originally come to South Africa for the benefit of their health, and that most of the cases were chronic in character.

*Venereal Diseases.*—These show an enormous reduction (see p. 552).

Syphilis is widespread throughout Cape Colony among the native population, and, as in the case of small-pox, municipalities spend money on preventive measures—very strong evidence of their importance. Venereal disease was extremely prevalent in Cape Town immediately before the war, and most of the disease shown in our records must have been contracted there.

*Diseases due to Animal Parasites.*—Incidence 7·34 per 1,000.

The only disease of this class which requires mention is that due to *Bilharzia hæmatobia*. Its importance lies, not in the number of cases which occurred during the campaign itself, but in the later evidence of infection shown by the numbers who have received temporary pensions on account of partial disablement from this disease. Major Erskine notes as regards Natal: "Very few soldiers subject to this disease came under treatment, and those who did came from the Newcastle district." In three years in Maritzburg only two cases are noted as having been possibly due to bilharzial infection. Major Smith reports as follows:—

"In ordinary times soldiers serving in South Africa were little subject to the disease, and it seems to have been of very minor importance as a cause of ill-health in former campaigns in that country. The Army Medical Department Reports for the period 1890 to 1898, when the garrison had an average annual strength of

4,164, make no mention of bilharzia, the nearest approach to it being eight cases of hæmaturia returned during the period; while the reports dealing with the sick statistics of the Zulu and first Boer Wars contain no reference to it.

"Bilharzia has long been known to be endemic in the Eastern Province of Cape Colony, in Natal, and in certain parts of the Transvaal. Its existence in the older colonies was brought to notice by Dr. John Harley in 1864, and by Staff Assistant Surgeon Batho, in the Army Medical Department Report for 1870. Dr. Batho reported that in Natal the disease was very common in boys, and that the colonists, who were familiar with it as boys at school, did not attach any importance to it.

"The Rustenburg district of the Transvaal was also known as a focus of the disease, and a year after the war the well-known war correspondent, Mr. E. T. Knight, spoke of its ravages among the civil population of that district.

"As regards its occurrence among the troops during the war, their constant movements, and their frequent transfer from one district to another, as well as our ignorance of the duration of the period of incubation, make it difficult to locate the places where the infection was acquired. That the disease occupied a considerable time in the development of its characteristic symptoms was indicated by the small number of cases that came under notice during the war. Notwithstanding these conditions the clinical histories of some of the cases afforded almost conclusive evidence of the existence of the disease in several new localities; the Kroonstad district, the valley of the Vaal River, and the Bush Veld country lying between Pretoria and Pietersburg.

"The Medical Officer in charge of No. 22 Stationary Hospital, Pietersburg, records the admission of three men of the Gordon Highlanders in the latter part of July, 1901, and one in August, for the disease. That regiment had been in the same district from the end of 1900, and of the cases mentioned one man gave a history of hæmaturia lasting for two months, two for four months, and one for five days. One of these first noticed blood in his urine, when on the march from Pienaar's River to Pietersburg, and it is probable that the disease was contracted at the former place. The man's regiment had been encamped for some months at Pienaar's River, a place 40 miles north of Pretoria."

The actual number admitted to hospital during the campaign was 187, but there is some reason to believe that the slighter cases either passed entirely without notice, or were so trivial that although recognised by the sufferer, no attention was paid to the

disorder. All the cases that have come under notice appear to belong to the first or second degree, that is, in the milder cases, there were no symptoms beyond the passage of a little blood at the end of micturition and some slight pain at the end of the penis, with occasional pain in the back; all these symptoms were aggravated by exertion, especially by riding. In the more severe cases all these symptoms were present in a higher degree of development, the amount of blood passed was relatively considerable, pain in the back and loins, radiating from there to the perineum, was constant and sufficient to cause discomfort. There was said to be anæmia, but in the cases of men on temporary pension (admitted to Queen Alexandra's Military Hospital at Millbank for observation) only a slight secondary anæmia was present. Similarly the alleged loss of weight did not take place while the patient was in hospital and properly fed. The trivial anæmia and loss of weight do not appear to be integral parts of the disease even in these cases; they are indirect effects. The sufferer is so far incapacitated, or feels himself to be incapacitated, for work that he is unable to continue in his employment, if he has obtained work, and these symptoms are in reality the result of underfeeding, not of the disease. The patients still in the Service, who came under observation, did not show either of these symptoms, even where the discharge of blood was considerable.

Cases of the third degree, that is, with secondary changes involving the bladder and other parts of the urinary tract, have not come under observation. The reason probably is that in all our cases the infection has been slight, exposure ceased when the case left the infected area in South Africa, and the number of parasites was thus limited.

Our records, however, show that even in the mild type of case which is most prevalent, a permanent cure is long delayed. The men come up for examination every six months, and it is usual to find the urine free from blood, albumin, or ova at one examination, and to find a recurrence at the next examination, or even after freedom on two consecutive examinations at six months' interval, to find a recurrence at the third. This points to an intermittence of the discharge of ova, and therefore to a decrease in their production, *i.e.*, a tendency to recovery, but absolute freedom appears to be long delayed.

The result of this persistent infection is in nearly all cases practically negligible, that is, the sufferer is able to work if he is not incapacitated by some other disability or by disinclination.

Treatment has been without any effect whatever. One patient

in Millbank, born and bred in Natal, stated that the Zulus were in the habit of using sea-water internally and by injection as a mode of cure. Salt by the mouth and rectum had, however, no effect on this case. Rectal infections have been very rare.

Nothing bearing on the mode of infection was observed during the campaign; the usual alleged sources were of course existent.

"The prevention of the disease is matter on which it appears desirable that some rules should be laid down. Urine, and probably fæces, should be destroyed; and latterly this has, we understand, been done as far as patients in hospital are concerned. It is obvious, however, that these measures are of little use unless the patient can be persuaded to continue to disinfect his excretions after leaving hospital. It is not likely that many of the afflicted would keep up such preventive measures very long" (Smith).

*Scurvy*.—Cases, 152; deaths, 11.

At no time was there any prevalence of this disease, or even of a scorbutic tendency, although from time to time it was alleged that in certain localities some of the troops suffered from spongy and bleeding gums. Chronic inflammation of the gums with supuration in the alveoli was so common that the confusion is quite possible. Jam formed a part of the ration, and during a great part of the campaign an issue of apricots or peaches was made, while vegetables were also issued.

As regards Ladysmith, Major Erskine reports as follows:—

"This disease only came under notice in the Natal army among the troops forming the garrison of the beleaguered town of Ladysmith, for Natal is a fruit-growing country where pineapples, other fruit and vegetables of all kinds are plentiful. As the siege progressed the scorbutic dyscrasia became evident in cases of obstinate dysentery of a peculiar kind. By-and-by certain cases cropped up indicative of land scurvy. The depressing conditions under which the men were serving and the damp and cold were strong predisposing causes; but the deprivation of fresh vegetable food in their daily rations was the determining factor. The rations served out during the latter part of the siege—from the middle of January till the relief on March 1st—consisted only of three small biscuits and a pound and a quarter of horse or mule flesh.

"*Symptoms*.—The only symptoms and signs presented by the cases detected in the town were malaise with wandering pains in the limbs, and fair-sized brawny patches of discoloration on the thighs and legs. The gum condition was not well marked, if at all.

"On the other hand, among the convalescents and sick at the hospital on the neutral ground of Intombi, 4 miles away, cases

occurred having all the classical signs and symptoms in a more or less aggravated form.

*Treatment.*—Cases which developed and were treated in the town were soon cured, as at the time the disease made its appearance the gardens of the private houses had begun to yield their seasonal supply of apricots. With the administration of these the malady disappeared so far as the garrison proper was concerned, only one death occurring in which hypostatic congestion of the lungs was the immediate cause."

*Rheumatism.*—Incidence, 55·09; mortality, 0·05 per 1,000.

Rheumatic fever is not common in South Africa, nor are articular affections frequent. The great liability to chill from sudden variations in temperature (as in Natal, where the temperature may fall 20 degrees in a few hours) tends to increase the prevalence of muscular forms of rheumatism. But, speaking generally, the effects of exposure are less than might be expected.

Major Smith writes:—

"*Rheumatic fever* was rare in spite of the hardships accompanying campaigning.

"*Muscular rheumatism*, though fairly common, was by no means so frequent as might have been expected in a long campaign with many old soldiers in the ranks. In the Pretoria hospitals there were close on 2,000 of these cases. They are mostly attributed to hard work and wettings. The Principal Medical Officer of No. 19 thinks a large number were due to constitutional syphilis. He found iodine of potassium the best treatment."

Major Erskine reports from Natal:—

"*Myalgia.*—This was quite a common affection. The muscles affected were usually those which the patient lay and slept on, and the cause was the hard, damp ground he had to use as a bed. In another class of cases, the pain in the soft parts was due to the continued pressure of accoutrements. This pain was severe on movement or palpation. The external muscles of the thigh, arm, and shoulder, also the abdominal and pectoral muscles, were most frequently affected.

"*Rheumatism.*—This was seldom arthritic, nearly always muscular. It was met with in the familiar forms of lumbago, pleurodynia, and at times stiff neck."

*Debility.*—Incidence, 46·77; mortality, 0·02 per 1,000.

Debility is a misleading term which should not be used. It is most usually employed to denote the after-effects of an acute disease, *e.g.*, enteric fever, dysentery, or malaria, especially where a readmission has taken place. This practice, however, renders

our statistics less valuable than they might be. It is also used where, for one reason or another, no diagnosis has been arrived at, and one has seen such well-defined pathological entities as chronic nephritis, diabetes, and even thoracic aneurism returned under this head, though in the last case the documents showed that the actual pathological condition had been recognised. For this reason, the class "debility" must always be looked on with suspicion—its true content can never be determined.

But in South Africa, besides the cases falling under one or other of types mentioned above, there was a considerable number of men, free from obvious disease, but worn out by the fatigues of the campaign—men probably of lesser stamina than their fellows, who required only a few days' rest and good feeding to set them up again. These were legitimately included under this heading.

(8) *Local Diseases* :—

*Diseases of the Nervous System*.—Incidence, 11·49; mortality, 0·20 per 1,000.

Compared with the period 1888-97, the distribution is as follows :—

Mental disease	..	War period	..	Incidence, 1·76	Mortality, 0·03
		1888-97	..	1·00	0·05
Other forms	..	War period	..	9·74	0·18
		1888-97	..	8·00	0·37

There is no great difference between these results.

The following table shows the number of cases and the corrected ratios per 1,000 for officers and men of all classes for certain forms of nervous disease :—

*Officers.*

Disease	REGULARS AND VOLUNTEERS		IMPERIAL YEOMANRY		COLONIALS		TOTAL	
	Cases	Ratio	Cases	Ratio	Cases	Ratio	Cases	Ratio
Mental ..	11	0·95	3	2·42	5	1·32	19	1·14
Neurasthenia ..	44	3·80	4	3·23	—	—	48	2·89
Epilepsy ..	7	0·60	7	5·65	—	—	14	0·84
Other forms ..	104	8·97	10	8·07	31	8·20	145	8·73
Total ..	166	14·35 ±0·69	24	19·36 ±2·41	36	9·52 ±0·98	226	19·61 ±0·63
<i>Other Ranks.</i>								
Mental ..	640	1·90	28	1·13	113	1·39	781	1·76
Neurasthenia ..	125	0·97	12	0·48	22	0·27	159	0·36
Epilepsy ..	835	2·47	77	3·11	125	1·54	1,037	2·33
Other forms..	2,429	7·20	256	10·35	446	5·49	3,131	7·05
Total ..	4,029	11·94 ±0·11	373	15·08 ±0·83	706	8·70 ±0·19	5,108	11·50 ±0·10

The gross incidence among the officers is seen to be always greater than among the men, but from the consideration of the probable differences, this is only significant among the Regulars and Volunteers; among the Imperial Yeomanry and Colonials the differences are not legitimately distinguishable on the numbers given. This greater incidence among the officers rather than the men of the Regulars and Volunteers is mainly due to a higher admission-rate for neurasthenia, and it is possible that the distinction is purely artificial, and that similar cases among the men were returned under the headings of "debility" or "disordered action of the heart."

The greater frequency of epilepsy among the Imperial Yeomanry may be noted; this, however, may be only accidental.

Comparing the different classes of officers, the ratios in the Regulars and Volunteers and Imperial Yeomanry are not distinguishable; on the other hand, Colonial officers showed a distinctly smaller incidence than the Regulars and Volunteers, and *ipso fortiori* than the Imperial Yeomanry. The men of the Colonial troops showed a distinctly smaller incidence than those of the Regulars and Volunteers, and those again than the Imperial Yeomanry; the chief cause of this difference was in both cases in the diseases termed "other forms" in the above table.

It is difficult to account for these differences. The two agents most universally invoked in relation to the origin of nervous disease, syphilis and alcohol, were for the most part non-effective during the campaign; their influence, however, would hardly develop during the comparatively short period of observation, and such influence as they exerted must have been chiefly before the beginning of the war. On the other hand, the distribution of these diseases among the different classes is not quite in accordance with accepted ideas as to the prevalence of alcoholism and syphilis in the same classes. Generally speaking, it seems as if the lesser prevalence was associated with the habit of physical labour and acquired ability to withstand fatigue.

One important point is that the recorded incidence does not represent the whole effect of the campaign in the production of nervous disease, especially of a functional type. It is impossible to obtain the number of cases due to, but coming on record after the campaign; there is, however, no doubt that a large number of individuals suffered, either immediately after the cessation of operations or at a later period, from various disorders, usually of a neurasthenic type, but many on the border line of mental disease or of other organic disease of the nervous system. It happens that

the cases which have come directly under observation have been almost entirely among officers, but there is reason to believe that the results among the other ranks have also been well marked.

Even allowing for this unknown increment, the total incidence of nervous disease of all types is by no means as great as one might have expected. As has been stated above, two important factors were practically absent; apart from epidemic disease, the general conditions were, as has been shown, by no means inconsistent with perfect bodily health.

Fatigue and exposure were at times excessive, but the men, though without superfluous flesh, were in splendid condition, and never better than in the last year of the war. There were, on the other side, the special conditions of war, the almost constant strain of watchfulness, the intermittent excitement of action, and, for the officer, the never-ending work and anxiety to carry on without a hitch.

Modern developments in the art of war and in the organisation of armies demand, it is said, a higher degree of intelligence in all ranks than has hitherto been found to be sufficient. The special form of intelligence that is most likely to be useful in warfare is that in which the imagination is highly developed, that intelligence which sees what is on the other side of the hill. It is this type, however, that is most exposed to the risk of the development of functional nervous disorders under unfavourable conditions, and, if this type become predominant, we must look for a greater prevalence of nervous breakdown than we have as yet experienced. The fact that a proportion of officers holding highly responsible positions broke down from the nervous strain was more or less explicitly recognised during the campaign; as regards the field army, it was not uncommon to hear that so-and-so had "lost his nerve," and sometimes another sphere of usefulness was found for the individual concerned. The same thing was to be observed in those whose duties brought them less prominently before the army generally. A careful examination of the history of the war points to the same conclusion, that of these superior intelligences it is only the exceptional man who can maintain his average standard of work for any length of time under such conditions as obtained in South Africa; some of these conditions were certainly not an essential part of the operations of war. An unknown American philosopher once remarked: "Damn your brains, give me a reliable set of bowels," and this expresses shortly the quality which is most likely to lead to efficiency in the long run. There is no doubt but that superiority in intelligence may be

purchased too highly; name and reputation will at the beginning of the breakdown carry through inferior work, and it is, unfortunately, at this stage that the individual concerned is more than ever convinced that he alone can get things done.<sup>1</sup> It is obviously a difficult task to remove such men when their work becomes untrustworthy and therefore dangerous. The greater part of the work of an army, as the greater part of the work of the world, can best be carried out by men of good health, average intelligence, and sound common-sense. These qualities are, fortunately, characteristic of the great majority of our officers and men. It only remains to ensure that they shall not only be allowed but required to make use of their abilities. The small leaven of genius which is needed for success must be carefully preserved for the work which can only be done by those fortunate enough to possess it.

Major Smith makes the following note:—

"*Paralysis* furnished fourteen cases at No. 2 General Hospital. Among them were some paraplegias due to myelitis coming on after exposure to wet and cold, and others following bad malaria. One of us (F. S.) describes a couple of cases which he met with on the march. The subjects were young, healthy-looking men, and good soldiers, who seemed perfectly willing to do their best, but were powerless on account of the weakness of their legs. After a day's rest they seemed all right, but before they had walked far their legs trembled, and they soon sat down—for a time again helpless. The condition seemed similar to that temporarily experienced sometimes by most of us when we subject a hand or arm to severe and prolonged exertion of an unusual kind, *e.g.*, pulling in a boat race without previous training. Presumably, the state was brought about in the two soldiers by long and repeated marching."

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<sup>1</sup> Perhaps the most striking example of this is to be found in the Comte de Ségur's account of the Moskow campaign.

## A SMALL OUTBREAK OF FEVER DUE TO BACTERIA HAVING UNUSUAL CULTURAL CHARACTERS.

BY MAJOR J. C. B. STATHAM.

*Royal Army Medical Corps.*

THE notes on the cases comprising this outbreak are published, as the bacteria isolated from the blood of three<sup>1</sup> of the patients have unusual cultural characters, in that, though possessing many of the features of the typhoid-colon group of bacteria, they ferment saccharose markedly and do not affect dulcitate.

Of the twenty-one atypical bacteria which I have isolated from the blood of cases of typhoid fever in South Africa, in the last four years, these are the first saccharose fermenters I have met.

I am unable at present to find any reference to similar bacteria having previously been isolated from the blood of typhoid cases. The question as to whether these bacteria can be classed under the typhoid-colon group, is discussed at the conclusion of this paper.

I am indebted for the clinical notes on Cases 1, 2, 3, 4, 5, and 6 to Captain Littlejohns; Cases 7, 8, 9, and 10 to Captain Dunkerton; Cases 11 and 12 to Lieutenant McQueen; and Cases 13 and 14 to Captain Potts.

Twelve of the fourteen cases mentioned in this paper were admitted to the Military Hospital, Roberts' Heights, within a period of ten days, the admissions ceasing as suddenly as they began.

The clinical features of this small epidemic of disease were as follows: Onset of disease more sudden than typhoid, pyrexial period (including the pre-hospital fever), probably seven to ten days; headache and pain in the body, dirty tongue, constipation, spleen tender but not enlarged. In half the cases a curious and profuse rash was present.

*Case 1.*—Private Sm., 2nd Hampshire Regiment (inoculated in November and December, 1908). Admitted to hospital on January 7th, 1910, complaining of dizziness, headache, and pains all over the body. The tongue was dirty; temperature 100·8° F. There was a profuse rash all over the body, arms, and legs; the spots were raised, rose-coloured, and faded on pressure. The patient stated that he had been feeling unwell for two days prior to admission.

*Progress of Case.*—The headache and backache lasted for four days.

<sup>1</sup> These three strains will be referred to throughout this paper as *Bacillus Sm.* (case 1); *Bacillus Sk.* (case 4); and *Bacillus W.* (case 13).

The pyrexial curve, which was of the dropping variety, is illustrated in the chart. The temperature fell to normal on the eighth day after admission. The rash cleared up and the tongue became clean. Constipation ruled throughout the illness.

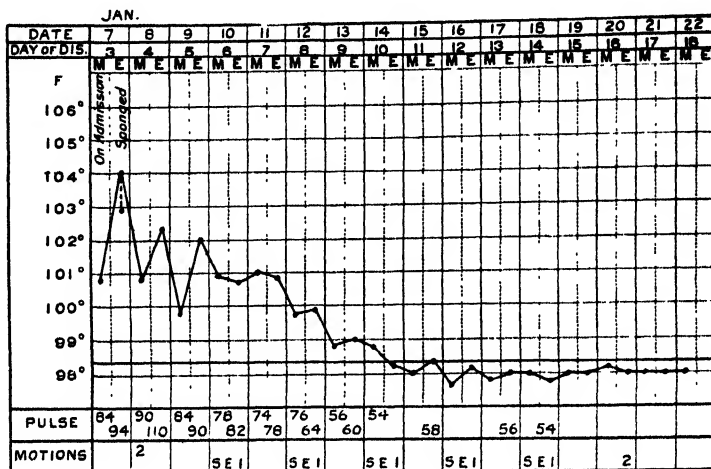


CHART 1.

*Bacteriological Notes on Case 1.*—A blood culture was taken from this patient on January 10th, 1910, 1½ cc. of blood from a finger being removed under antiseptic precautions, and placed in 6 cc. of taurocholate-peptone broth. The blood bile-salt mixture after twenty-four hours inoculation at 37° C. was plated out on large Petri dishes containing (1) agar, and (2) Fawcous medium. An apparently pure culture of a bacillus was obtained on both media, the growth on the Fawcous medium after forty-eight hours incubation showing as dark green opaque colonies surrounded by a haze of precipitated bile salts, while the growth on the ordinary agar consisted of a number of semi-transparent colonies. The morphological and cultural reactions of this micro-organism, which I shall hereafter describe as "*Bacillus Sm.*" were as follows:—

*Morphological Characters.*—A motile rod, Gram negative.

*Cultural Characters.*—(1) Agar slope: Copious semi-transparent growth. (2) Broth: Turbidity and slight scum. No indol reaction after fourteen days. (3) Glucose litmus broth: Acid and gas twenty-four hours. (4) Lactose litmus broth: Acid and gas twenty-four hours. (5) Mannite litmus broth: Acid and gas twenty-four hours. (6) Levulose litmus broth: Acid and gas twenty-four hours. (7) Dulcitol litmus broth: Slight acid, no gas, even up to fourteen days. (8) Maltose litmus broth: Acid and gas twenty-four hours. (9) Dextrin litmus broth: Acid and gas twenty-four hours. (10) Saccharose litmus broth: Acid and gas

forty-eight hours. (11) Litmus milk: Acid twenty-four hours, clot on seventh day.

On gelatine plates the bacillus grew in semi-transparent colonies after forty-eight hours at 22° C. The colonies resembled those of the *Bacillus coli communis*, but were thicker, and became yellowish on the fifth day. There was no liquefaction of the medium up to three weeks.

The following agglutination tests were carried out with the blood serum of this patient, dilution 1 in 30, unless otherwise stated:—

The bacillus isolated from his own blood: Positive up to 1 in 100, one hour. Incomplete half-hour, positive one hour, January 22nd, 1910. Incomplete half-hour, positive one and a half hours, January 31st. The bacillus isolated from the case of Private Sk.<sup>1</sup>: Positive half-hour (1 in 30), (1 in 100) one hour, January 14th, 1910. *B. typhosus* negative in half-hour, trace in one hour, January 10th, 11th, and 31st. *B. paratyphosus* A (Schotmüller), negative up to one and a half hours, January 18th and 22nd. *B. paratyphosus* A (Brion and Kayser) negative up to one and a half hours, January 24th. *B. paratyphosus* B trace after one and a half hours, January 10th and 11th, negative January 31st, 1910. *B. coli communis* (from tap water) negative up to two hours, February 1st.

*Control Tests.*—The bacillus isolated from Private Sm. was tested with the blood sera of nine healthy men from Roberts' Heights, Pretoria, the dilution of blood used being 1 in 30; the result was negative with all but one, at the end of one hour.

The blood sera of a number of cases of suspected typhoid received at the Army Medical Service Laboratory from out-stations were tested with B. Sm. With 19 such blood sera in dilutions 1 in 30 negative results were obtained in every instance but two, when a slight reaction was obtained at the end of one hour.

*Case 2.*—No. 4358, Private P., 3rd Hussars, aged 21, service eight to twelve years. Admitted on January 8th with a temperature of 101·4° F., and complaining of severe pain in the head, back, and stomach. He had been vomiting during the previous night and was constipated. He stated he had not been feeling well for some little time. On examination there was some tenderness over the spleen, which, however, was not enlarged. That evening his temperature rose to 102·6° F. On the 9th his temperature in the morning was 100·4° F., in the evening 102·2° F. Next morning his temperature fell to 99·0° F., and he felt much better. He continued to improve until the 14th, when in the morning his temperature again went up to 100·0° F., and in the evening to 103·4° F. Headache and backache now returned, and he said he felt ill again. This lasted until the 17th, when his temperature was practically normal. His headache and backache continued to improve until on the 19th he was quite well again.

<sup>1</sup> Sk. was Case 4 of the series mentioned in this paper.

*Antityphoid Inoculation.*—The first dose was given on October 28th, 1909, and the second dose November 6th, 1909.

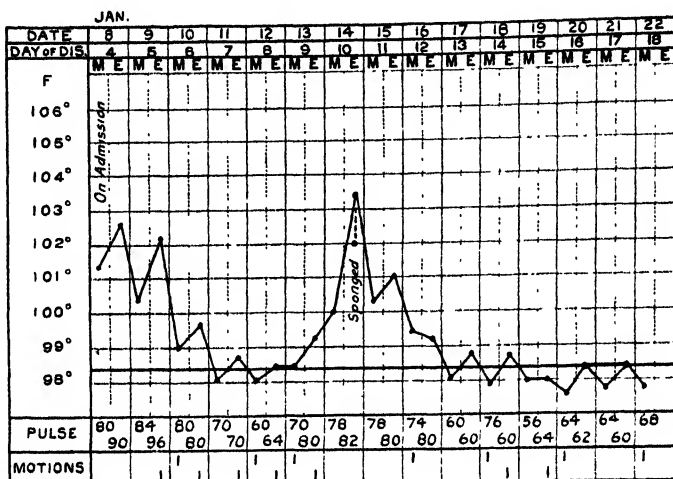


CHART 2.

*Bacteriological Notes on Case 2.*—A blood culture was taken from this patient during a short relapse of fever on January 15th, 1910; it proved sterile when incubated and plated. Serum tests with the following bacteria proved negative (dilution 1 in 30): *B. paratyphosus*, type B. *B. paratyphosus* A (Schotmüller). *B. paratyphosus* A (Brion and Kayser). With *B. typhosus* a very slight and incomplete reaction was obtained at the end of an hour on January 17th. On January 31st the serum of this patient in a 1 in 30 dilution gave a positive reaction against the bacillus isolated from Private Sk.'s blood, Case 4, but only after three hours. Tested (in a 1 in 30 dilution) with the bacillus isolated from Private Sm. (Case 1), an incomplete reaction was obtained on January 17th, 1910, after one and a half hours, complete in two hours; a complete positive reaction on January 20th, in one hour; and an incomplete reaction on January 31st, in one hour, showing first a rise and then a decline in the specific agglutinating power of the blood against B. Sm. This patient's blood was examined for malaria on January 16th, with negative results (2 slides examined).

*Case 3.*—No. 4091, Private R., 3rd Hussars, aged 25, service three years, nine months. Admitted to hospital on January 9th, complaining of pain in the back of the head and neck; he had a furred tongue, temperature 102.6° F., and a profuse rash all over the body, arms, and legs, rose-coloured and in some places rather darker coloured; the spots faded on pressure; there was slight tenderness over spleen, which was not palpable.

*Previous History.*—Patient had been unwell for five days before admission, had not drunk unboiled water; all milk was boiled; he had eaten no uncooked vegetables, but had eaten apples.

*Progress of Case.*—Temperature at about 103° F. for four days, then dropped rapidly daily, reaching normal on the eighth day after admission. The rash faded rapidly and there was no unfavourable symptom, headache disappeared on the third day, tongue cleared up rapidly after the temperature became normal; convalescence without interruption. There was constipation throughout.

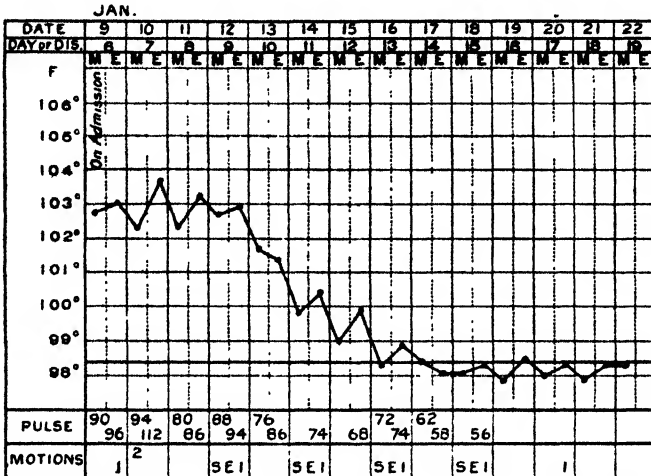


CHART 3.

*Bacteriological Notes on Case 3.* A blood culture taken on the same day (about 1½ cc. of blood removed) proved negative (sterile). This patient's blood serum (1 in 30 dilution), gave the following reactions: With B. Sm., incomplete reaction half an hour, positive one hour, January 17th. With B. Sm., incomplete reaction one hour, January 22nd, January 24th, and January 25th. With B. Sk., positive one hour, January 14th. With *B. typhosus*, negative one hour, January 11th and January 31st. With *B. paratyphosus* B negative one hour, January 11th. With *B. paratyphosus* A (Schotmüller) negative, one hour, January 22nd. With *B. paratyphosus* A (Brion and Kayser), negative one hour, January 24th. A culture was made from Private R's urine on January 20th, 1910; it proved to be sterile.

*Case 4.*—No. 8764 Corporal Sk., Royal Engineers, aged 27, service eight years and nine months. Patient was admitted to hospital on January 9th complaining of headache, backache, pains in the arms and legs. The tongue was dirty, temperature 103.2° F. There was a profuse rash all over the body, arms, and legs; it was raised, rose-coloured, and faded on pressure. Patient had been unwell for five days.

*Previous History.*—Drank ordinary tap-water always; had eaten lettuces and tomatoes uncooked; had spent a few days under canvas at Hennops River, camping out for a Christmas picnic, which is a custom of the Royal Engineers at this time of the year. He did not drink unboiled water there.

*Progress of Case.*—The temperature dropped gradually every day, reaching normal on the eighth day, rash and tongue cleared up gradually; at no time could the spleen be felt; headache and pain in the back lasted four days. Constipation throughout. Convalescence uninterrupted.

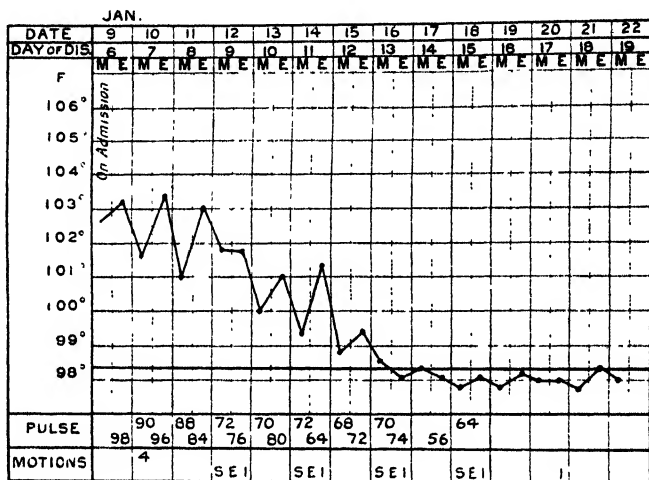


CHART 4.

*Bacteriological Notes on Case 4.*—Blood culture taken on January 10th, 1910, with the result that a pure culture of an organism culturally and morphologically identical with that isolated from Private Sm. (Case 1) was obtained. The agglutination reactions obtained with this bacillus were also found to be similar to those obtained with the organism obtained from Private Sm. There is no doubt that in B. Sm. and B. Sk. we are dealing with identical organisms.

*Determinative Serum Tests.*—The bacillus isolated from Sk., when tested with his own blood, gave a positive reaction up to 1 in 60 in one hour.

Sk.'s blood serum in a 1 in 30 dilution with B. Sm. gave the following results: Positive half an hour, January 17th. Positive one hour, January 22nd. Incomplete one hour, January 24th and January 25th. Negative one hour, January 31st, indicating a rapid fall in the agglutinins.

In a 1 in 30 dilution the bacillus obtained from Sk.'s blood was negative with the following bacteria: *B. typhosus*, January 11th, one

hour; *B. paratyphosus* B, January 11th and February 1st, one hour; *B. paratyphosus* A (Schotmüller), January 22nd, one hour; *B. paratyphosus* A (Brion and Kayser), January 24th, one hour; *B. coli communis* (from tap water), February 1st, two hours.

Thirteen out of fourteen blood sera of typhoid cases occurring in stations other than Roberts' Heights failed to agglutinate *B. Sk.* (dilution employed being 1 in 30). *B. Sk.* was also not agglutinated by the diluted (1 in 30) blood sera of five healthy men at Roberts' Heights.

Case 5.—No. 1204 Serjeant-Major L., M.P.S.C., aged 35, service seventeen years three months. Patient was admitted to hospital on January 10th complaining of headache; temperature 100.4° F.; tongue slightly furred. On the evening of admission his temperature rose to 103.0° F. He had been feeling unwell for five days previous to reporting sick. He had not drunk unboiled water, but had eaten plenty of uncooked vegetables, lettuces, and tomatoes, prior to admission.

As there was a past history of malaria on the West Coast of Africa, blood films were examined on the 11th, 12th, and 14th instant, but with negative results.

He had no spots at any time, and the temperature came down to normal on the fifth day after admission to hospital. He is convalescing rapidly now, and his only symptom is a slightly furred tongue.

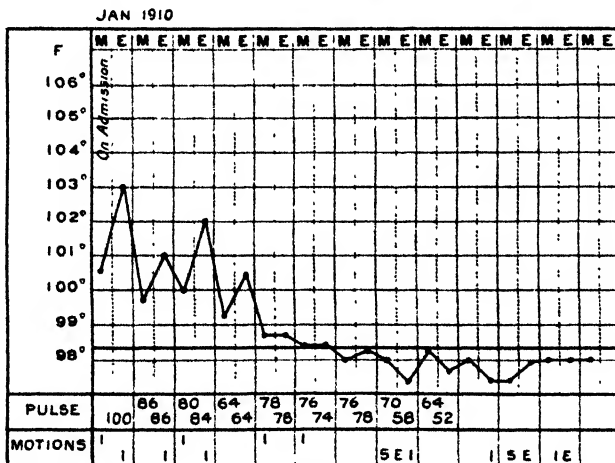


CHART 5.

*Bacteriological Notes on Case 5.*—Blood culture taken on January 13th, 1910 (2 cc. of blood removed), result negative, sterile. This patient's blood serum, when tested in a 1 in 30 dilution, gave the following results: With *B. Sk.*, positive in half an hour, also up to 1 in 100 dilution, January 14th. With *B. Sm.*, positive in half an hour, January 17th. With *B. Sm.*, incomplete half hour; positive 1 hour, January 22nd,

With *B. Sm.*, incomplete in one hour, January 24th, and January 31st. With *B. typhosus*, negative in two hours (three occasions), January 11th, January 17th, and January 31st. With *B. paratyphosus* B, negative one hour (twice), January 11th, and February 1st. With *B. paratyphosus* A (Schothmüller), negative one hour, January 22nd. With *B. paratyphosus* A (Brion and Kayser), negative, one and a half hours, January 24th. With *B. coli communis* (from tap water), negative two hours, January 2nd.

As Serjeant-Major L. had served some years previously on the West Coast of Africa, and firmly believed he was suffering from malaria, his blood was examined for malaria on three occasions—July 11th, 1910, January 12th, and January 14th—but neither the malarial parasite, nor any of the blood conditions found in malaria could be detected.

*Case 6.*—No. 8358, Private McN., 2nd South Staffordshire, aged 21, service one year and six months. Patient admitted to hospital on January 12th complaining of headache, pain in back, knees, and wrists. Tongue was dirty. Temperature 103° F., and there was a profuse rash all over body, arms, and legs, which was rose coloured, fading on pressure.

*Previous History.*—Patient had been ill for three days; denied having drunk any unboiled water, or eaten uncooked vegetables; had eaten bananas.

*Progress of Case.*—Headache, pain in the back and wrist persisted for seven days, salicylates did not affect the pain in the wrists, which he complained of very much. The rash faded gradually. Temperature was between 102.0° and 104.4° F. for four days, then began to fall in the mornings, and came down to 99.0° F. on the eighth day after admission; no pain, but tongue was very much furred. Constipation throughout.

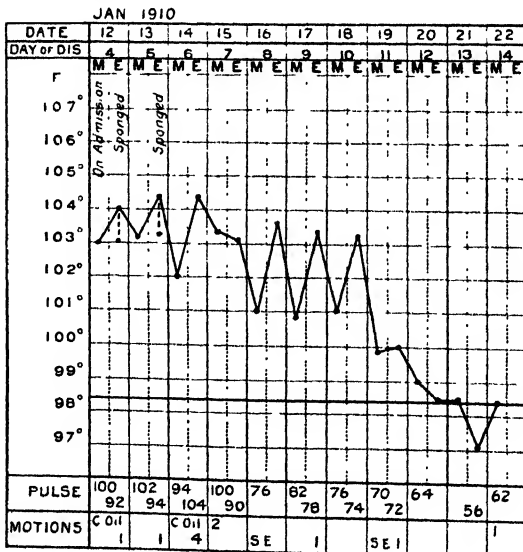


CHART 6.

*Bacteriological Notes on Case 6.*—Blood culture ( $1\frac{1}{2}$  cc.) taken on January 13th, 1910, result negative, sterile. Taken again on January 15th, (2 cc.) again sterile. This patient's blood serum, when tested in a 1 in 35 dilution, gave the following results:—

With B. Sk. positive in half an hour, January 14th. With B. Sm. positive in half an hour, January 17th. With B. Sm. incomplete in half an hour, positive one hour, January 22nd. With B. Sm. incomplete in one hour, January 30th. (A marked fall in agglutinating power to be observed here.) With *B. typhosus*, negative in one hour thrice, January 11th, January 17th, and January 2nd. With *B. paratyphosus* B, negative in one hour twice, January 11th and February 1st. With *B. paratyphosus* A (Schotmüller), negative in one hour, January 22nd. With *B. paratyphosus* A (Brion and Kayser), negative in one hour, January 24th. *B. coli communis* (from tap water) negative in two hours, February 1st, 1910. A culture made from the patient's urine proved negative, sterile, January 20th. The blood was examined for malaria, with negative result, January 16th.

*Case 7.*—Mrs. N. The patient was first seen on January 11th, 1910. She had been ill for about seven days, and said that for the previous two or three nights she had suffered from fever. She complained of a very severe headache (frontal), backache, pains in the limbs, loss of appetite, constipation, and general malaise. Her temperature was 100·6 F. Tongue furred. Spleen tender and slightly enlarged. No spots on abdomen. That night her temperature was 101·0° F., and the headache, which was still very severe, was mitigated by phenacetin and caffeine. Blood films were examined for malarial parasites on the 14th with negative results.

On the 17th her temperature fell to normal. The headache and tenderness of spleen gradually diminished, and her tongue cleaned.

The patient states that all the water and milk used in her house are boiled.

Antityphoid inoculation was performed twice in January, 1909.

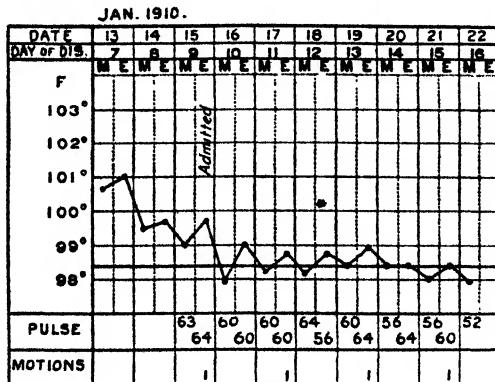


CHART 7.

*Bacteriological Notes on Case 7.*—No blood culture taken. Mrs. N.'s blood serum, when tested in a dilution of 1 in 30, gave the following results:—

With B. Sk., incomplete reaction in half an hour, complete in one hour, January 14th, 1910. With B. Sm., positive in half an hour, January 17th. With B. Sm., incomplete in half an hour, complete in one hour, January 22nd. With *B. typhosus* negative in one hour, January 13th. With *B. paratyphosus* A trace in one hour, January 13th. With *B. paratyphosus* B, negative in one hour, January 20th. With *B. paratyphosus* A (Schotmüller) negative in one hour, January 22nd. With *B. paratyphosus* A (Brion and Kayser), negative in one hour, January 24th. With *B. coli communis* (from tap water), negative in two hours, February 1st. *B. coli communis* was isolated from this patient's urine (probably of intestinal origin), which did not agglutinate with her blood serum.

*Case 8.*—Miss C., patient first seen on January 14th, when she had been feeling ill for about a week. Her temperature was 99.4° F., tongue clean. She complained of severe frontal headache, loss of appetite, pain in the back, and occasional abdominal pains. The bowels were regular. No spots on abdomen. Spleen could not be felt, but she was tender over that region. Her temperature the following night went up to 102.0° F. at six o'clock, and she had a rigor, the headache was very severe, and she felt inclined to vomit; temperature next morning 99.6° F., and symptoms much less severe, probably due to the administration of powder of phenacetin and caffeine. Admitted to hospital on the 17th inst., when her symptoms gradually improved, and her temperature remained normal. The patient had not been inoculated against enteric fever, and stated that all the water and milk used in the house was boiled.

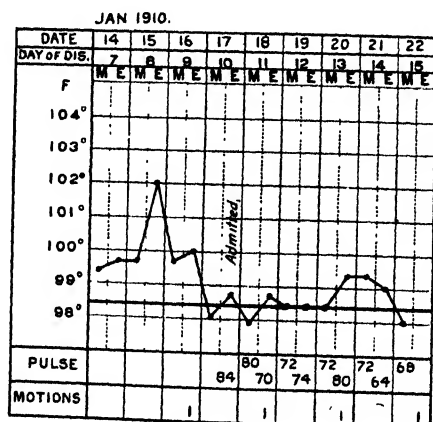


CHART 8.

*Bacteriological Notes on Case 8.*—No blood cultures were taken. Blood examination for malaria proved negative, January 16th, 1910. The

patient's blood serum in 1 in 30 dilution gave the following results: With B. Sk., positive reaction in half an hour, January 15th. With B. Sk., incomplete in half an hour, January 22. With B. Sm., positive reaction in half an hour, January 17th. With B. Sm., incomplete reaction in half an hour, positive, one hour, January 22nd. With *B. typhosus* negative in one hour, January 17th. With *B. paratyphosus* B, trace in one hour, January 13th., With *B. paratyphosus* B, negative in one hour, January 20th. With *B. paratyphosus* A (Schotmüller), negative one hour, January 22nd. With *B. paratyphosus* A (Brion and Kayser), negative one hour, January 24th. A culture made from the urine on January 30th was negative.

Case 9.—Mrs. McK., living in 3rd Hussars lines. Patient was first seen in her quarters on the evening of January 16th. She had been ill for about a week. Her temperature was 102·8° F. She complained of severe frontal headache, backache, pains in all the joints and limbs. Her tongue was slightly furred and she looked ill. No spots on abdomen, but one or two suspicious rose-red spots on the lower part of the chest. Her spleen was enlarged and tender. She was at once admitted to hospital when her pulse was 140, and respirations were 48. No physical signs in chest. Had a sleepless night owing to headache and pain in the back. Next morning her temperature was 101·0° F., symptoms unchanged. The following day she lost all her symptoms.

She has not been inoculated against enteric fever, and stated that the water used in her house was boiled, but not the milk.

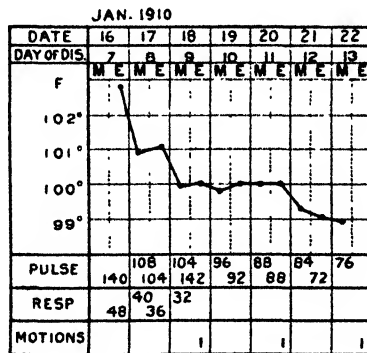


CHART 9.

*Bacteriological Notes on Case 9.*—Blood culture not taken. This patient's blood serum in dilution of 1 in 30 was tested with the following strains: B. Sm., positive in half an hour, January 17th, 1910. *B. typhosus*, negative up to two hours, January 17th. *B. paratyphosus* B, negative up to one hour, January 20. *B. coli communis* (isolated from tap water), negative up to two hours, February 1st.

A culture was made from the urine on January 22nd, and a bacillus of the colon group isolated, which, however, was not agglutinated by the patient's blood serum, and did not culturally resemble the bacteria isolated from the blood of cases 2, 4, and 13. This micro-organism was probably of intestinal origin.

*Case 10.*—Mrs. P., from 3rd Hussars lines. Patient was first seen on January 17th, when she complained that she had had severe headache, backache, pains in the limbs, loss of appetite, and general malaise for the previous five days. Her temperature was 99·6. Tongue thickly furred and tremulous. Conjunctivæ injected and her facial expression showed that she was evidently ill. Bowels were constipated.

She was at once admitted to hospital, and that night her temperature was 101·8° F., pulse 96. The headache and backache were extremely severe. No spots on abdomen, no enlargement of spleen, but considerable tenderness over that region. On the 18th inst. temperature morning and evening was 100·4° F. She gradually improved, the pains disappeared and the tongue cleaned. Bowels were still constipated.

She stated that all the water used in her house was boiled, but not the milk. She had not been inoculated against enteric fever.

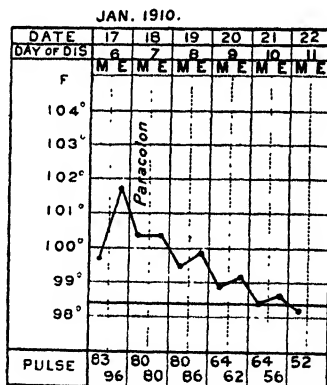


CHART 10.

*Bacteriological Notes on Case 10.*—Blood culture not taken. This patient's blood serum in a 1 in 30 dilution was tested with the following strains: B.Sm., positive in half an hour, January 17th, 1910. *B. typhosus*, negative up to two hours, January 17th. *B. paratyphosus* B, negative up to one hour, January 20th. *B. coli communis* (isolated from tap water), negative up to two hours, January 2nd. Culture made from the urine gave negative results, January 22nd.

*Case 11.*—No. 4263 Private M., 3rd Hussars, aged 19, service nine months. Admitted on January 17th with a temperature 101·2° F., complaining of a sore throat, and pains in the head and stomach. His

tongue was dirty, face flushed, and a few suspicious spots were present on the lower part of the abdomen. His bowels had acted that morning, before admission. Pulse 78. Patient stated that he had felt generally out of sorts for the previous two days—had slept badly and eaten practically nothing. Next morning his temperature had fallen to 99° F., pain in head and stomach less severe. Throat showed slight congestion of the fauces only. Bowels acted during afternoon—stools normal. Next morning his temperature was a little below normal, the pain had all gone, and patient said he felt quite well.

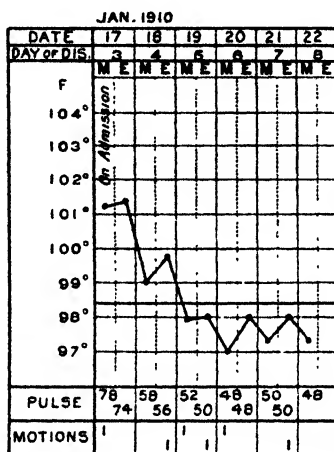


CHART 11.

*Bacteriological Notes on Case 11.*—Blood culture taken on January 17th, 1910, result negative, sterile. This patient's blood serum in a 1 in 30 dilution gave the following reactions: With B.Sk., positive in half an hour, January 18th. With B.Sm., positive in half an hour, January 18th. With B.Sm., positive in one hour, January 20th. With B.Sm., positive in one hour, January 22nd. With B.Sm., incomplete reaction in one hour, January 25th. With B.Sm., incomplete reaction in one hour, January 31st. M.'s blood serum in a 1 in 30 solution proved negative with: *B. typhosus*, twice, January 18th, and January 31st (one hour). *B. paratyphosus* B, once, January 20th (two hours). *B. paratyphosus* A (Schottmüller), once, January 22nd (one hour). *B. paratyphosus* A (Brion and Kayser), once, January 24th (one hour). *B. coli communis* (from tap-water), once, February 1st (two hours).

*Case 12.*—No. 2284 Private J., 3rd Hussars, aged 21, service one year and eleven months. Admitted on January 17th, with temperature 100.0° F., and complaining of a sore throat, pain in head and stomach; tongue furred, and he looked very ill. He stated his bowels had been very loose, and he had a motion shortly after admission. The throat was inflamed,

the fauces being red and injected looking. There were no spots present. He said he had had a headache for two days, but that the stomach pain had only come on the previous evening. In the evening his temperature had risen to 101.4° F., otherwise no change. Next morning temperature was normal, and patient looked and said he felt much better, although the pain in the head had not gone. In the evening he was still better. Bowels had acted normally during the afternoon. Next day his temperature was slightly below normal, the headache had gone, and he stated he felt nearly all right again.

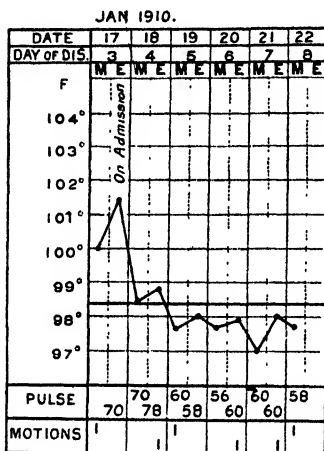


CHART 12.

*Bacteriological Notes on Case 12.*—Blood culture taken on January 17th, 1910, result negative. The following serum reactions were carried out, dilution used being 1 in 30: With B.Sk., positive in half an hour, January 18th. With B.Sm., positive in half an hour, January 18th. With B.Sm., positive in half an hour, January 22nd. With B.Sm., positive after one hour, January 25th. With B.Sm., positive after one hour, January 31st. With *B. paratyphosus* B, trace one hour, January 20th. With *B. paratyphosus* B, trace one hour, February 1st. With *B. paratyphosus* A (Schottmüller), negative two hours, January 18th, 1910, and January 22nd. With *B. paratyphosus* A (Brion and Kayser), negative one hour, January 24th. With *B. coli communis* (tap-water), negative two hours, February 1st.

*Case 13.*—T. W., daughter of Serjeant W., 2nd Hants Regiment, aged 16. Admitted on March 10th, 1910. Patient had been feeling ill for four or five days prior to admission. On admission she had a temperature of 103.0° F., a severe headache, dirty tongue, and a profuse rash over the trunk, legs and arms, palms of hands, and soles of feet. The spots

were slightly raised, pink in colour, and faded on pressure. The rash was darker red in parts. The spleen could not be felt, nor was there any tenderness over it.

Patient progressed quite favourably and the temperature fell to normal on the eighth day after admission. The rash gradually faded and the tongue cleared up: convalescence uninterrupted.

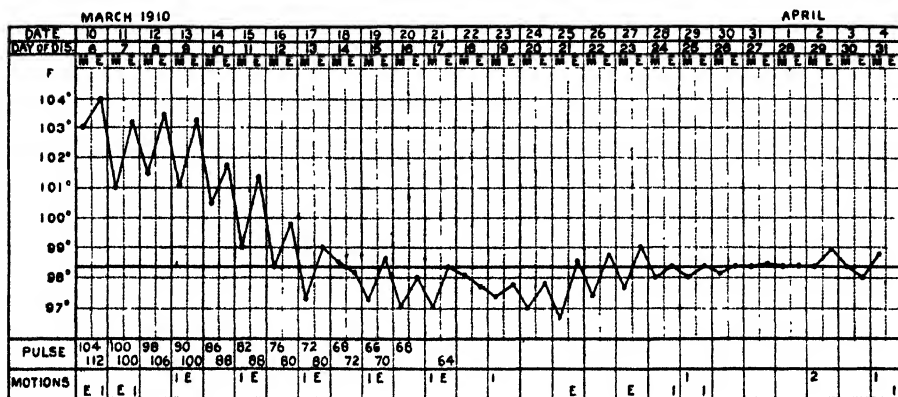


CHART 13.

*Bacteriological Notes on Case 13.*—A blood culture was taken on March 11th, 1910,  $1\frac{1}{2}$  cc. of blood being obtained from a finger and placed in taurocholate-peptone broth and incubated. From this medium when plated out on brilliant green and ordinary agar, a pure culture of bacteria culturally identical with those found in Case 1 (B.Sm.) and Case 4 (B.Sk.) was isolated. The serum of this patient in a 1 in 30 dilution gave the following results: With the bacillus isolated from her own blood (W.), positive in half an hour, March 14th and March 16th. With *B. typhosus*, incomplete reaction in one hour, March 16th. With *B. typhosus*, trace only, March 20th. With *B. paratyphosus* A, negative, March 16th and March 19th. With *B. paratyphosus* B, negative, March 16th and March 19th.

The urine of this patient was examined bacteriologically on April 8th, and again on May 1st; result negative.

*Case 14.*—A. A., daughter of Serjeant A., 2nd Hants Regiment, aged 10. Admitted to hospital on March 30th, 1910. Complained of having felt ill for several days before admission. When admitted patient had a temperature of  $102.2^{\circ}$  F., headache, furred tongue, and rash all over the body, limbs, and hands. The patient's temperature fell to normal on the fifth day after admission to hospital. It rose again to  $99.0^{\circ}$  F. and remained between  $99.0^{\circ}$  F. and  $100.0^{\circ}$  F. for some days afterwards. The patient was constipated throughout.

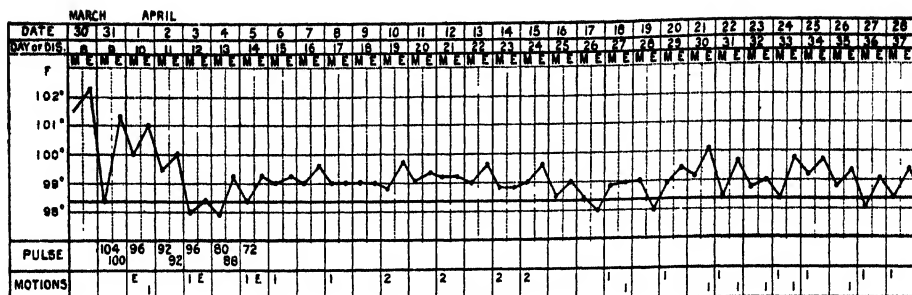


CHART 14.

*Bacteriological Notes on Case 14.*—No blood culture taken. This patient's blood when tested in a 1 in 30 dilution gave the following results: With *B. typhosus*, negative in one hour, March 30th, 1910, April 12th, and April 18th. With *B. paratyphosus* A, negative in one hour, March 30th, April 12th, and April 18th. With *B. paratyphosus* B, negative in one hour, March 30th, April 12th and April 18th. With B.W. (from Case 13), positive in one hour, March 30th and April 12th (two hours). With B.Sm. (from Case 1), incomplete reaction in one hour, April 12th.

The urine was examined bacteriologically on May 12th. A strain of *B. coli* was isolated (probably of intestinal origin) which did not react with the patient's serum.

*Résumé.*—Fourteen cases of illness occurred in epidemic form, and were characterised by a pyrexia of seven to ten days' duration, symptoms of intestinal disturbance, a tender spleen, headache, and body pains, and in half the cases a curious and profuse rash. Bacteria of unusual character, but apparently identical, were isolated from the blood of three of the cases. These bacteria were markedly agglutinated by the diluted blood sera of the patients from whom they were individually derived. Two of these three bacteria (the third could not be so tested) were agglutinated markedly by the diluted blood of all the fourteen cases comprising the outbreak, described in this paper.

That these bacteria were responsible for this outbreak of disease, and that the agglutination reactions obtained were specific, is shown by the fact that the intensity of the agglutination reactions diminished as the cases became convalescent. Control tests carried out showed that these bacteria were not agglutinated by the diluted blood sera of a number of cases of typhoid fever occurring at stations other than Pretoria, nor by the similarly diluted blood sera of a number of healthy men.

No positive agglutination reaction was obtained with the blood of any one of these fourteen cases when their diluted blood sera was tested with *B. typhosus*, *B. paratyphosus* B, and two varieties of *B. paratyphosus* A.

The urine of seven of the fourteen cases was examined bacteriologically, but no aid in making a diagnosis was obtained.

The stools of these cases were not examined, as the bacteria which had been isolated from the blood in three of the cases (and appeared from their reactions with the blood of all the other cases to be the cause of the outbreak), grew on media exactly like the *B. coli communis*. Had there been any reason to suspect that the cases were due to typhoid or paratyphoid bacteria, a bacteriological examination of the stools would, of course, have been made. But even if typhoid bacilli had been found, the fact would in no way have negatived the conclusions naturally drawn from the presence of other bacilli in the blood. And as for paratyphoid bacilli, it is now known that they may be found in the stools of healthy people.

Most of the admissions in this outbreak were crowded into a period of ten days, and the cases themselves were of brief duration. The very limited time at my disposal was devoted to making cultures from the blood and exhaustive serum reactions.

Classical typhoid fever is not the rule in Pretoria. Cases here have usually a shorter pyrexial period, abdominal symptoms are less marked, and rashes more frequently seen. In some cases these rashes are very profuse.

From time to time I have examined the blood or excreta of cases of pyrexia associated with these profuse rashes without obtaining any information of diagnostic value. Some seven or eight months ago Major McNaught and myself investigated several such cases. Blood, urine, and stools were examined with almost invariable negative results.

Had a specific micro-organism not been isolated from the first case admitted, it seems highly probable that the exact bacteriological nature of this outbreak would not have been recognised.

Every effort was made to secure accuracy in the bacteriological diagnosis of these cases. The medium used for blood cultures was taurocholate-peptone broth, which has the advantage over ox-bile that its sterility and constant composition can be assured.

The incubated blood-bile-salt mixture was plated out on large Petri dishes, containing (1) agar, and (2) brilliant green agar (Fawcus). From the ten blood cultures made from nine cases' 1 to 2 cc. of blood being taken in each case, pure cultures of the

bacteria described in this paper were obtained on three occasions from three cases.

Cultures from six of the remaining cases were sterile on both agar and brilliant green agar plates. In one instance a pure culture of staphylococcus was found.

Control tubes of the taurocholate medium used for cultures were found to be sterile when examined.

The cultural reactions of the three strains isolated are given below:—

Strain	Agar slope	Broth	Gelatine	LITMUS BROTH CONTAINING 1 PER CENT.								Litmus milk
				Glucose	Lactose	Mannite	Levulose	Maltose	Saccharose	Dextrin	Dulcitol	
B. Sm...	Like <i>B. coli</i>	Turbidity and scum; no indol	Like coli, but thicker; no liquefaction	A. and G.	A. and G.	A. and G.	A. and G.	A. and G.	A. and G.	A. and G.	Little or no change	Acid and clot 7 days.
B. Sk...	"	"	"	"	"	"	"	"	"	"	"	Acid about 4th day.
B. W...	"	"	"	"	"	"	"	"	"	"	"	Acid about 5th day.

Dr. Mitchell, Bacteriologist to the Transvaal Government, kindly tested strain Sm. for me. The media he employed was that of His. The results obtained by Dr. Mitchell were identical with those shown in the table above, with the exception that with dextrin strain Sm. formed acid, but no gas; and with two other carbohydrates (glycerine and salicin), not employed by me, acid, but no gas was formed by this micro-organism.

The cultural reactions of these bacteria would bring them into the colon group, according to the definition of the English Committee<sup>1</sup>; but many English and American authorities would consider that gas production in saccharose and dextrin media, and the absence of indol formation, separate these bacteria definitely from the *B. coli* of Escherich (Savage<sup>2</sup>). On the other hand, Horrocks,<sup>3</sup>

<sup>1</sup> "Report of the English Committee on Standardization of Methods for Bacterioscopic Examination of Water." Quoted by Savage, p. 77.

<sup>2</sup> Savage, "Bacteriological Examination of Water Supplies" (1906), p. 79.

<sup>3</sup> Horrocks, "The *B. coli communis*, considered as an Indicator of Sewage Contamination of Water Supplies," JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. i., p. 202, 1903.

Theobald Smith, and others accept acid and gas production in saccharose media, as among the properties of *B. coli*. Durham differentiated the saccharose type of *B. coli* under the heading of *B. coli communior*. Vourloud,<sup>1</sup> who made a prolonged research on the reactions obtained with various bacteria in a large number of carbohydrate media found saccharose to be fermented, and gas formed with four out of five colon bacteria obtained from various human or animal sources; and in three out of four obtained from water.

Vourloud, in the same paper, gives a *résumé* of the opinions of various authorities on the saccharose fermenting power of the *B. coli communis*, and quotes Escherich and Pfaundler, Macé, Chantemesse, Widal, and Grimbert, as authorities who accept the property of saccharose fermentation with gas production as one of the characters of the *B. coli communis*; while Péré and MacConkey consider it may produce acid, but no gas in this medium.

The three bacteria isolated in this epidemic would not be included in the *B. coli* group given in Twort's<sup>2</sup> most exhaustive paper, but would be classed in the group along with *B. lactis aerogenes* and *B. cloacæ*. The bacteria isolated by me differ markedly from these just named by their inability to liquefy gelatine and their mobility.

*Pathogenicity*.—One-sixth of a twenty-four hour culture of two of these strains failed to kill either guinea-pigs or rabbits injected intraperitoneally with them. But colon, and even typhoid, bacteria vary markedly in their pathogenic power towards animals.

*Agglutinability*.—The three bacteria mentioned in this paper when first isolated were not readily agglutinated by blood sera except by those of the cases comprising the epidemic; in striking contrast with many colon bacteria which are readily agglutinated in low dilutions by the sera of typhoid patients, and even healthy men (Lorrain Smith,<sup>3</sup> Burke<sup>4</sup> and De Haan).<sup>5</sup>

These bacteria, though tested with the serum of a series of

<sup>1</sup> Vourloud, "Actions de quelques bactéries sur les hydrates de carbon et le lait toursole," *Cent. f. Bakt.*, Bd. xlv., Heft 2 and 8. \*

<sup>2</sup> Twort, *Cent. f. Bakt.*, Bd. xl., December 4th, 1907, p. 512.

<sup>3</sup> Lorrain Smith and Tenant. Quoted by Savage, p. 97.

<sup>4</sup> Burke, "Untersuchungen über Bakterien der Coli-gruppe," *Cent. f. Bakt.*, Bd. xlv., December 31st, 1907.

<sup>5</sup> De Haan, *Cent. f. Bakt.*, Bd. xliii., Referate.

DETAILS OF SERUM (WIDAL) REACTIONS CARRIED OUT ON THE FOLLOWING CASES:—

No of case	Rank, initial	Date of admission	GROUP OF BACTERIA WITH WHICH THE SERUM OF THESE 12 CASES WAS TESTED		
			Bacillus isolated from Sm. (Case 1)	Bacillus isolated from Sk. (Case 4)	<i>Bacillus typhosus</i>
1	Pt. Sm. ..	7.1.10	+ $\frac{1}{2}$ hr. 17.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 22.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 24.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 27.1.10 ± $\frac{1}{2}$ hr. + 1½ hr. 31.1.10	+ $\frac{1}{2}$ hr. 14.1.10	× 1 hr. 10.1.10 × 1 hr. 11.1.10 - 1 hr. 31.1.10
2	Pt. P. ..	8.1.10	± $\frac{1}{2}$ hr. + 2 hr. 17.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 20.1.10 - $\frac{1}{2}$ hr. ± 1 hr. 31.1.10	- 1 hr. + 3 hr. 14.1.10	× $\frac{1}{2}$ hr. ± 1 hr. 17.1.10 - $\frac{1}{2}$ hr. × 2 hr. 31.1.10
3	Pt. R. ..	9.1.10	± $\frac{1}{2}$ hr. + 1 hr. 17.1.10 ± $\frac{1}{2}$ hr. ± 1 hr. 22.1.10 - $\frac{1}{2}$ hr. ± 1 hr. 24.1.10 - $\frac{1}{2}$ hr. ± 1 hr. 25.1.10	± $\frac{1}{2}$ hr. + 1 hr. 14.1.10	- $\frac{1}{2}$ hr. - 1 hr. 11.1.10 - up to 4 hr. 31.1.10
4	Cpl. Sk. ..	detained 9.1.10 ad. 10.1.10	+ $\frac{1}{2}$ hr. 17.1.10 - $\frac{1}{2}$ hr. + 1 hr. 22.1.10 - $\frac{1}{2}$ hr. ± 1 hr. 24.1.10 - $\frac{1}{2}$ hr. ± 1 hr. 25.1.10 - $\frac{1}{2}$ hr. - 1 hr. 31.1.10	± $\frac{1}{2}$ hr. + 1 hr. 14.1.10	- 1 hr. 11.1.10
5	S.-Major L.	10.1.10	+ $\frac{1}{2}$ hr. 17.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 22.1.10 ± $\frac{1}{2}$ hr. ± 1 hr. 24.1.10 ± $\frac{1}{2}$ hr. ± 1 hr. 31.1.10	+ $\frac{1}{2}$ hr. 14.1.10	- 1 hr. 11.1.10 - 2 hr. 17.1.10 - 2 hr. × 3 hr. 31.1.10
6	Pt. McN.	12.1.10	+ $\frac{1}{2}$ hr. 17.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 22.1.10 ± $\frac{1}{2}$ hr. ± 1 hr. 30.1.10	+ $\frac{1}{2}$ hr. 14.1.10	- 1 hr. 11.1.10 - 2 hr. 17.1.10 - 2 hr. 31.1.10
7	Mrs. N. ..	15.1.10	+ $\frac{1}{2}$ hr. 17.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 22.1.10	± $\frac{1}{2}$ hr. + 1 hr. 14.1.10	- 1 hr. 13.1.10
8	Miss C. ..	17.1.10	+ $\frac{1}{2}$ hr. 17.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 22.1.10	+ $\frac{1}{2}$ hr. 15.1.10 ± 1 hr. ( $\frac{1}{3}$ ) 22.1.10	- 1 hr. 17.1.10
9	Mrs. McK.	17.1.10	+ $\frac{1}{2}$ hr. 17.1.10	Not tested	- 2 hr. 17.1.10
10	Mrs. P. ..	17.1.10	+ $\frac{1}{2}$ hr. 17.1.10	Not tested	- 2 hr. 17.1.10
11	Pt. M. ..	17.1.10	+ $\frac{1}{2}$ hr. 18.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 20.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 22.1.10 ± $\frac{1}{2}$ hr. ± 1 hr. 25.1.10 ± $\frac{1}{2}$ hr. ± 1 hr. 31.1.10	+ $\frac{1}{2}$ hr. 18.1.10	- 1 hr. 18.1.10 - 1 hr. 31.1.10
12	Pt. J. ..	17.1.10	+ $\frac{1}{2}$ hr. 18.1.10 + $\frac{1}{2}$ hr. 20.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 22.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 25.1.10 ± $\frac{1}{2}$ hr. + 1 hr. 31.1.10	+ $\frac{1}{2}$ hr. 18.1.10	- $\frac{1}{2}$ hr. ± 1½ hr. 18.1.10 - $\frac{1}{2}$ hr. ± 1½ hr. 31.1.10

*Note.*—All these serum reactions were carried out with a serum diluted fifteen times—*i.e.*, a total dilution of 1 in 30 when added to the bacterial emulsion; + signifies complete clumping—no free bacteria; ± signifies that there was considerable clumping, but also some free bacteria; ± signifies that along with many definite clumps there were also many free bacteria; × signifies the slightest possible reaction.

DETAILS OF SERUM (WIDAL) REACTIONS CARRIED OUT ON THE FOLLOWING CASES:—

No. of case	GROUP OF BACTERIA WITH WHICH THE SERUM OF THESE 12 CASES WAS TESTED				Remarks
	<i>B. paratyphosus</i> A (Schottmüller)	<i>B. paratyphosus</i> A (Brion and Kayser)	<i>B. paratyphosus</i> B	<i>B. coli communis</i> isolated from tap-water at R. H.	
1	- 1½ hr. 18.1.10 - 1½ hr. 22.1.10	- 1½ hr. 24.1.10	× 1½ hr. 10.1.10 × 1½ hr. 11.1.10 - 1½ hr. 31.1.10	- up to 2 hr. 1.2.10	<p>A marked positive agglutination reaction was obtained in all cases with the bacteria isolated from Sm. (Case 1) and Sk. (Case 4).</p> <p>In eleven of the twelve cases the agglutination reaction was most marked when the blood was first examined. In one case (P.) a more marked reaction was obtained three days after admission than when admitted.</p> <p>In all twelve cases there was a distinct diminution in the serum reactions against B. Sm. and B. Sk. as the patients became convalescent.</p>
2	- 1 hr. 18.1.10	- 1½ hr. 24.1.10	- 1½ hr. 11.1.10	- up to 2 hr. 1.2.10	
3	- 1 hr. 22.1.10	- 1½ hr. 24.1.10	- 1 hr. 11.1.10	Not tested	
4	- 1 hr. 22.1.10	- 1½ hr. 24.1.10	- 1 hr. 11.1.10 - 1 hr. 1.2.10	- up to 2 hr. 1.2.10	
5	- 1 hr. 22.1.10	- 1½ hr. 24.1.10	- 1 hr. 11.1.10 - 1 hr. 1.2.10	- up to 2 hr. 1.2.10	
6	- 1 hr. 22.1.10	- 1 hr. 24.1.10	- 1 hr. 11.1.10 - 1 hr. 1.2.10	- up to 2 hr. 1.2.10	
7	- 1 hr. 22.1.10	- 1 hr. 24.1.10	× 1 hr. 13.1.10	Not tested	
8	- 1 hr. 22.1.10	- 1 hr. 24.1.10	- 1 hr. 20.1.10	Not tested	
9	Not tested	Not tested	- 1 hr. 20.1.10	Not tested	
10	Not tested	Not tested	- 1 hr. 20.1.10	Not tested	
11	- 2 hr. 18.1.10 - 2 hr. 22.1.10	- 1 hr. 24.1.10	- 1 hr. 20.1.10	- 2 hr. 1.2.10	
12	- 2 hr. 18.1.10 - 2 hr. 22.1.10	- 1 hr. 24.1.10	× 1 hr. 20.1.10 × 1 hr. 1.2.10	- 2 hr. 1.2.10	

*Note.*—All these serum reactions were carried out with a serum diluted fifteen times—i.e., a total dilution of 1 in 30 when added to the bacterial emulsion; + signifies complete clumping—no free bacteria; ± signifies that there was considerable clumping, but also some free bacteria; ∓ signifies that along with many definite clumps there were also many free bacteria; × signifies the slightest possible reaction.

typhoid cases from out-stations, and of healthy men at Roberts' Heights, were not agglutinated except feebly on three occasions.

In some recent work Burke and De Haan [5] came to the conclusion that between 25 and 40 per cent. of coli strains are agglutinated by normal or typhoid blood sera, but that the agglutinability depends on the nature of the bacillus itself rather than the source of the serum with which it is tested.

An extremely interesting discovery made when working with these bacteria was the fact that while subculturing on artificial media made them more and more agglutinable with control sera—in fact ultimately unreliable—the bacteria in the original taurocholate-peptone-broth blood mixture remained inagglutinable by normal sera for months. Subcultures first made from the original blood culture tube were found to be reliable, and only such cultures were used throughout the agglutination tests.

Major McNaught made every effort to trace the source of infection in this epidemic.

While six of fourteen cases came from the 3rd Hussars' lines, the other three were admitted from various other units in the Garrison.

The water supply seemed to be the ~~only common~~ factor in the epidemic, and Major McNaught found *B. coli communis* present at this period in 0.5 cc. of the water in the Cantonment Reservoir. Of the *B. coli* which he isolated from this source, one strain, which gave cultural reactions resembling the three strains isolated from the blood, was tested against the sera of seven of the first twelve cases; it failed to be agglutinated by these sera in even the lowest dilutions (1 in 20).

The source of this outbreak was thus never traced.

The very high percentage of clinically atypical cases of typhoid seen in South Africa is rivalled by the equally high proportion of atypical bacteria of the typhoid-colon group which are isolated from these cases. From nearly 100 strains of typhoid-colon bacteria, which I have isolated from the blood of typhoid patients in South Africa, nearly one-quarter are atypical. Many of these bacteria cannot be conveniently classed under the terms Para-typhoid A or B, with which we are familiar. One's ideas and conceptions with regard to typhoid-like disease are ever broadening, and the complex etiology and synptomatology of this great group disease—typhoid—comes home to us more clearly when we read or hear of the constant addition of new varieties to the already large group of bacteria which are responsible for typhoid-like disease.

## AMBULANCE WAGON. "MARK I. (LIGHT.)"

BY CAPTAIN A. R. TWEEDIE.

*Royal Army Medical Corps (T.).*

THE fact that at least *three* patterns of ambulance wagon are now being used in the Service affords sufficient reason to assume that no ideal type has yet been attained, which supposition, if admitted, is urged as adequate apology for this article.

Not that it is proposed to write any wholesale condemnation of all existing patterns, or to completely ignore all previous attempts towards the best and most comfortable transport of sick in the field, but rather, by a process of elimination, based on this previous experience, to point out that pattern along whose lines all further improvement should proceed.

As a preliminary proposition, everyone will, of course, readily concede that *cateris paribus* the lighter vehicle should always be preferred to the heavier form of conveyance, on grounds of general economy; from the point of view of horse-flesh, at least, the more the load can be reduced compatible with efficiency, the more mobile the transport obviously becomes, and, next to the immediate comfort of the sick, mobility should certainly form the keynote of all attempts towards improvement, more especially when mounted troops have to be served.

No one who served in South Africa can have failed to notice (if he did not, indeed, actually experience) the cumbersome ambulance wagon then in use, the large drain on transport animals which its traction entailed, or the series of successive jerks with which, at the phlegmatic, though assertive, "Hek" of the Kaffir driver, the reluctant team discordantly "took the strain," and the lumbering conveyance eventually got under way, with a lurch which brought many a shudder to the more fortunate onlooker with visions in his mind of enteric ulceration perilously near perforation, of compound fractured femora, and of the various gun-shot wounds of the thorax and abdomen; it must, indeed, have caused many an unnecessary spasm of pain, if nothing worse, to the unfortunate occupants within.

Quite apart from any further modifications, which I think, however, would very considerably enhance its present value, I consider that "Mark I. (Light)" Ambulance Wagon is far superior to the other forms, and is the pattern which should be exclusively adopted and elaborated as found convenient; and this for many reasons, amongst which I would especially mention:—

That only two horses are necessary, as compared with either four or six in the heavier patterns.

That thus two horses are sufficient to transport eight men, whereas in the heavier wagons four horses, at least, are considered necessary for a load of only twelve men.

That its road space is only some 23 feet as against from 40 to 50 feet required with the heavier patterns and their teams.

That the facility with which a team can be uniformly brought into draught varies indirectly with its numbers—a pair of horses can be more easily started or halted together than four or six.

That similarly the smaller the team, the easier it is to manœuvre the wagon, and where the "illimitable veldt" is not always available, this factor becomes of very considerable importance.

That one pattern of wagon would economise repair-equipment, and with one standard size and interchangeable parts the maximum amount of use could be made of partially damaged wagons.

For these main reasons "Mark I. (Light)" seems to far surpass the heavier forms; it is somewhat difficult to understand why any heavy wagon should have been devised since in civilised warfare the Geneva Convention obviates the necessity of anything approaching "a hospital on wheels," whilst under other circumstances the nature of the ground would probably prohibit the use of a more cumbersome conveyance, which besides creates a much greater demand on transport animals.

Three main postulates, I consider, should be kept in view in the elaboration of the ideal ambulance wagon, in addition to the various other details in respect of economy of space, weight, &c., which experience has taught to be practicable, and the carriage of sick in time of war demands.

The first of these—though they are all, perhaps, of equal importance—is that the wagon should be furnished with four wheels of as large a diameter as possible, and of equal size. From a fairly large experience of travelling on uneven ground, I am sure that under such conditions conveyance over rough country is rendered more easy than if the wheels are small and unequal in size. This requirement has already been carried into effect in "Mark I. (Light)."

The second object to be aimed at is to obtain as long a wheel-base as possible. This must always bear some constant proportion to the space necessary to accommodate a stretcher, plus what is required for the driver's seat, so that a certain maximal figure obtains for this item, any increase of which means some unnecessary

utilisation of material. Now, the length of the wheel-base in all three patterns is approximately the same, viz., 90 inches ("Mark VI." has 95 inches), but it would seem possible, in the case of the light wagon, to increase this one foot by setting the rear axle farther back, and, if required, furnishing additional support by inserting a third spring between the forepart of the body and the rod connecting the two axles, just to the rear of the rollers on which the fore-wheels engage when turning.

The third point is the value of the springs. This also must bear a certain proportion to the maximal load, and from this follows an extremely important corollary—viz., that the springs must become of less and less value the more the wagon load is decreased.

Now, "Mark V.\*" and "Mark VI." accommodate twelve sitting, or four lying down—that is, the springs must be up to the weight of twelve men; thus it results that when carrying four lying cases, only one-third of the load necessary to bring them into action is available, so that then their value is very considerably reduced, and just at that very time when it is most required, as presumably the four lying-down cases will be more serious than those able to sit up.

Such a discrepancy at present occurs in all forms of wagon, since lying-down cases require more floor space than those sitting up; and, indeed, these conditions obtain in "Mark I. (Light)"; but it would appear perfectly easy to reduce the disproportion in this case by at least one-half. This could be effected by furnishing accommodation for two extra lying-down cases—that is, four in all—in a manner similar to that adopted in the heavier wagons—namely, by the provision of rails above the seats, which could be lowered to support two extra stretchers above those on the floor; and I would claim that besides the obvious extra utility, a considerable gain in comfort for the patients would thereby be obtained.

In addition, *with a still further modification*, the light wagon could be adapted to accommodate an *equal* load under almost all circumstances with varying combinations of lying-down and sitting-up sick. This might be effected in one of several ways. Thus:—

(a) If the driver's seat were moved forward one foot (see sketch), a space one foot and a half wide would be provided behind it which would be ample room for two extra patients, one on each side, who would sit facing outwards with their feet over the side of the wagon, and in this way exactly the same total number of patients could be carried with four lying-down cases inside. (Of course these two extra seats could be utilised if the wagon were filled

with six sitting-up cases, thus bringing the maximal carrying capacity up to ten; but it might be advisable to regard this accommodation as "emergency seats," bearing in mind the remarks made above as to springs, and to restrict the maximal load to eight). Between these two patients a space about 18 inches square would be left in which patients' kit could be stowed.

This modification would not appear to necessitate any alteration of the under-carriage, but the fore-wheels might be moved forwards another foot if stability were not thereby sacrificed, and thus another foot in length added to the wheel base, which would constitute yet another argument in favour of this suggestion, if my postulate in this respect be admitted. Neither should it bring the footboard of the driving seat too near the quarters of the wheel-horses or affect the road space required or area necessary for turning, and the only material alteration would be in point of weight, an item which should not amount to more than some 50 lb.

(b) An alternative plan by which this extra sitting accommodation might be provided would be obtained by having a movable box-seat which could be shifted forwards when necessary so as to leave sufficient space for two extra patients sitting as above described, behind the driver's seat (in some such manner as the seat can be adjusted in a dog-cart in order to afford sitting accommodation at the back). The driving-box in this case would require very little alteration from the present pattern.

(c) A compromise between these two schemes might be carried out—*e.g.*, by advancing the driver's box 6 inches and making the seat itself movable forwards as well.

(d) Finally, and this would seem to be perhaps the most simple method by which this extra sitting accommodation might be acquired, the existing ledge marked "A B" in the sketch, which is just 6 inches wide, could be extended backwards along the upper border of the back-rest 1 foot and so the requisite space be obtained for a side seat. Some further details as to the interior seats and tilt would then only have to be worked out to fit in with this last plan, but these would not appear to present any very great difficulty. Moreover, the existing pattern could be easily converted in accordance with this last method, and it is this plan by which particularly I would recommend that the extra accommodation should be obtained. The fact that the body is 2 feet narrower than the width of the wagon would allow for the provision of a rest 1 foot wide for the feet of patients occupying these side seats.

To recapitulate, I would suggest some such improvements in the light wagon as follows:—

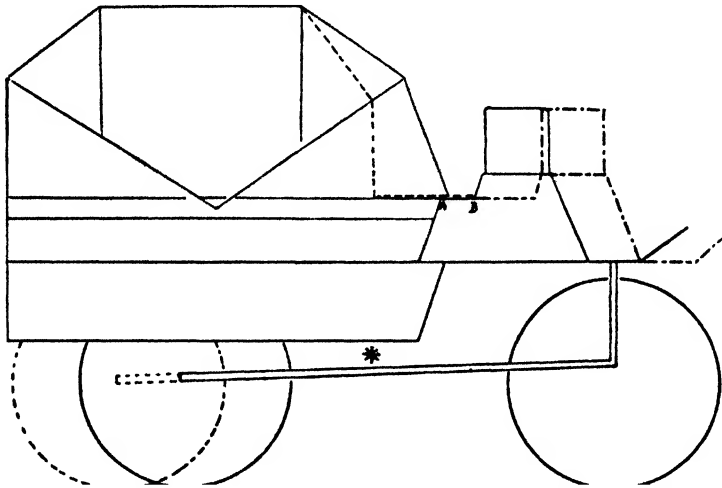
Lengthening the wheel-base as above described.

Furnishing accommodation for two extra stretchers and two extra side "emergency seats" as above described.

Inserting a third spring and support as above described.

Furnishing the cover with extra buckles to enable its fore-part to be looped up.

The provision of an adjustable ventilating shutter in the fore-end of the "well" of the wagon.



OUTLINE ELEVATION OF "MARK I. (LIGHT)" AMBULANCE WAGON.

Continuous black line indicates the existing pattern.

Dash dot lines illustrate the modification of the driver's seat, as suggested under (a), (b), and (c).

Dotted lines represent the position and size of the side seat and tilt, as recommended under (d), and also how the hind wheels might be set back.

\* Is the position of the extra spring recommended.

That the method described under suggestion (d) is the best manner in which the main idea should be carried out.

The tables on p. 701 for purposes of ready comparison have been drawn up for me by Serjeant-Major Taylor, R.A.M.C., Instructor to the Notts and Derby Mounted Brigade Field Ambulance, to whom I am also much indebted for many points in the preparation of this article.

This second table has been worked out in order to form an example of the scheme and its resultant advantages. The result of this comparison may be summarised as follows :—

(1) A saving of six drivers and twelve horses with the necessary rations and equipment (but plus six wagon orderlies).

(2) Increased carrying capacity.

(3) Increased mobility and manœuvring power, also 16 independent units (if required) in lieu of 10, against which must be placed a slight increase—viz., 12 yards of road space occupied in "column of route."

(4) With the wagon modified on the lines mentioned in the foregoing article, the number of patients it is possible to carry is the same in any combination—viz., 8 in each wagon.

Sixteen has been taken above as the probable total number of ambulance vehicles which would be issued to a cavalry ambulance with the adoption of this scheme—that is, the present equipment of four light wagons being retained, and each of the six heavy wagons being supplanted by two of the pattern recommended.

Under these circumstances this unit would be enabled to serve six additional centres at the same time, a very considerable gain in its ability to distribute its strength and a point of no small importance if one reflects for a moment on the mobility of the arm it has to serve, the possible very extended nature of operations and the chances of a number of simultaneous "calls" in different directions.

Indeed, the more one considers the question the greater the superiority of the modified light wagon appears, and under the headings of facility of loading and unloading, time occupied in hooking-in and unhooking, wear and tear to material and initial cost of wagons, gear, and team, a great deal more might be written; but quite enough has been said to accentuate the added value to the Service of this modification if the proposition is otherwise sound.

It is not claimed in any way that the idea has been worked out in detail, as that must be left to the practical wagon-builder, and the rough sketch of the existing type and its proposed alterations are only offered as an outline on which the principles suggested above might be carried out; it remains for a competent designer to say if such a plan is feasible.

If it is, then a brief survey of the tables alone should be amply sufficient to commend the project to serious consideration and to support the main thesis of this argument. That all further efforts in ambulance wagon construction should be developed on the lines of "Mark I. (Light)."

TABLE OF COMPARISONS.

Vehicle	Accommodation		Horses allowed	Length with pole	Width maximum	Height maximum	Track	Length with team	Weight	Minimum turning space
"Mark I. (Light)"	(A) 2 lying and 2 sitting	(B) 8 sitting	(C) 1 lying and 5 sitting	22ft. 4in.	6ft. 3in.	8ft. 9in.	5ft. 2in.	7 yd.	15cwt. 2qr. 23lb.	21ft.
"Mark VI."	4 lying and 3 sitting (a)	15 sitting (a)	2 lying and 9 sitting (a)	23ft. 1in.	7ft. 3in.	11ft. 1in.	6ft. 0in.	16 yd.	23cwt. 2qr. 6lb.	26ft. *
"Mark V."	4 lying and 2 sitting (a)	14 sitting (a)	2 lying and 8 sitting (a)	21ft. 11in.	6ft. 1in.	9ft. 2in.	5ft. 2in.	11 yd.	23cwt. 0qr. 10lb.	30ft. 7in. *
"Mark I. (Light)," modified	4 lying and 4 sitting	8 sitting	1 lying and 7 sitting	22ft. 4in.	6ft. 3in.	8ft. 9in.	5ft. 2in.	7 yd.	15cwt. 2qr. 23lb.	21ft.

\* N.B.—Leaders must be unhooked to turn in this space.

(a) These numbers include patients carried on the box seat.

(b) The number sitting should read 6, i.e., 4 in the wagon and 2 on the box.

(c) Only 4 horses are allowed for the heavy ambulance with a Mounted Brigade Field Ambulance.—(Ed.)

# MOUNTED BRIGADE FIELD AMBULANCE AS AT PRESENT EQUIPPED COMPARED WITH SAME UNIT EQUIPPED WITH 16 "MARK I. (LIGHT)" WAGONS.

Vehicles	Horses	Drivers	Road space in column of route	Accommodation		
Present ..	44 (a)	22 (a)	164 yd.	(A)	(B)	(C)
16 "Mark I. (Light)" ..	32	16	176 yd.	28 (b) lying and 24 sitting	122 sitting	16 lying and 74 sitting
16 "Mark I. (Light)" modified	32	16	176 yd.	32 lying and 32 sitting	128 sitting	16 lying and 80 sitting
				64 lying and 64 sitting	128 sitting	16 lying and 112 sitting

(a) 36 horses and 16 drivers are allowed.

(b) Should read 32 lying down—i.e., 24 in heavy ambulance wagons and 8 in the light ambulance wagons.—(Ed.)

## CLEARING HOSPITALS AND THE TERRITORIAL FORCE: A PROPOSITION.

By MAJOR E. C. FREEMAN.  
*Royal Army Medical Corps (Retired Pay).*

THE excellent paper by Lieutenant-Colonel M. W. Russell in the June number of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS very distinctly lays down the duties to be performed by a clearing hospital. The information conveyed by the paper is the more important and interesting because clearing hospitals have only lately appeared in war establishments, and have never formed part of a British army in war.

In the Regular Army these hospitals (one of which is to be attached to each Division<sup>1</sup>), in common with other medical field units, do not exist in peace, and are only actually organised on the outbreak of war.

In the Territorial Force, on the other hand—where there are no reservists to fall back on and each man enlists for a special corps and a particular duty—all the field units are thoroughly organised in peace time; therefore where such units do not exist, measures have to be taken at once to supply their place—without waiting for the outbreak of war.

In the South African war the rôle of clearing hospitals was performed by general hospitals pushed forward to Bloemfontein, Pretoria, and other places convenient for the purpose; but this cannot be done in the Territorial Force, as the Territorial Force general hospitals are fixtures at the places where they mobilise.

There is at present no organisation whatever in the Territorial Force for clearing hospitals, convalescent dépôts, or ambulance trains, all such duties having been relegated to the British Red Cross Society.

Even a cursory glance at Lieutenant-Colonel Russell's paper will demonstrate that the duties of a clearing hospital, as there set out, can never be performed by any civilian society, however efficient it may be.

The British Red Cross Society has established county branches, and these are engaged in dotting the whole of the United

<sup>1</sup> Clearing hospitals are provided in the proportion of one to a division, but are L. of C. and not divisional units.—ED.

Kingdom with "Voluntary Aid Detachments," which consist roughly of either forty-eight men or twenty women, as the case may be, with appropriate officers and sub-officers, all trained in "first aid." Now it must be remembered that the Red Cross does not compete with the Territorial Force for recruits. No man who should be serving his country in the ranks is allowed to salve his conscience by serving in a voluntary aid detachment. It follows that (except in rural districts which cannot be provided with the necessary facilities for drill) the men of the voluntary aid detachments are either over the age for active service or are prevented by their employment from complying with the regulations for efficiency as Territorial soldiers.

The same applies to the officers of the voluntary aid detachments: either they are doctors who are interested in ambulance work, but not keen enough to join the Royal Army Medical Corps Territorials, or who cannot leave their practices to attend camp, or they are retired combatant officers who are prevented by age or infirmity from serving their country in a more active capacity.

Of the ladies, as no physical test is laid down, it may be permitted to say that a very large number are quite unsuited to endure the hardships incidental to any campaign.

Moreover none of the officials or *personnel* of the voluntary aid detachments have the necessary military status, nor are the majority of them expected or prepared to serve outside the boundaries of their own town or village.

Now Lieutenant-Colonel Russell lays down that the clearing hospital must be at least semi-mobile, that it has to work on the very edge of—if not within—the fighting zone, and has the arduous duties of carrying out the transit of the sick from the field ambulance to the base: and of checking the wastage due to the minor cases which require immediate treatment only, and must be returned to the front as quickly as possible. Besides this, there is, of course, the work of classifying the sick according to the accommodation they require, of feeding and preparing them for their journey, and of carrying out urgent operations. Also the work of seeing to identification and so forth, the care of arms and accoutrements, and all the thousand and one things indispensable from military hospital administration.

Finally, there is the burning question of transport, which is dealt with (as Colonel Russell points out) in a very nebulous way in the regulations for the Regular Forces, and will therefore be a very hard matter indeed for the Commandant of a voluntary aid

detachment to cope with in the case of invasion, where no regulations are laid down, and where the forces will be in many respects most irregular.

As an example of the present state of things, let us take a medical staff ride held last winter. It was proposed that a voluntary aid detachment should, during the action, assist at the common collecting station for the wounded from all the field ambulances, whence the wounded were to be transferred to the neighbouring town. This was well and good, but the voluntary aid detachment in question, being composed of local village people, would certainly have been fully occupied in getting their families and belongings out of harm's way, as the village was included in the battle. Then it was arranged that the two voluntary aid detachments of the adjacent town should form a clearing hospital at a railway station conveniently near, and entrain the sick and wounded for London or Cambridge.

Now imagine the turmoil and confusion which would have ensued. Wounded and stragglers would have come in pell-mell, as the scene of action was close by. There was no one with military authority and no military guard. The trains would have been rushed, the serious cases left at the station, all military equipment lost, and probably the food for the sick consumed by famished soldiers. It would have been necessary to detach at least one tent section from the nearest field ambulance to form a centre and nucleus round which the voluntary aid detachments might have been profitably employed, and the work of the clearing hospital put through.

From the above imaginary catastrophe a lesson may perhaps be learnt, and the following suggestions are put forward, with all deference, simply on the ground that the writer has some experience both of the Royal Army Medical Corps Territorials and of the work of the British Red Cross Society.

Under existing regulations the general hospitals of the Territorial Force have each a cadre in peace time of three officers and forty-two men. This nucleus, on mobilization, is brought up to war strength by the addition of men supplied by the Red Cross or St. John's, the *à la suite* medical and surgical staff, and the members of the Territorial Nursing Service. It has already been arranged that the Red Cross men for the hospitals need not belong to voluntary aid detachments, but can be attached to and trained by the hospital cadre. Now, if permission were granted for another two medical officers and some twenty men to be attached to this

general hospital cadre, they would in their turn form the cadre of a clearing hospital. Given this trained nucleus, the balance of the divisional clearing hospital could well be supplied by civilians trained to first aid—the trained medical officers and N.C.O's making all the difference between a fairly efficient unit and a hopelessly inefficient one. If another medical officer and another ten men were added, we should then have the cadre of the divisional ambulance train, the balance on mobilization being made up in the same way from civilian sources, a proportion of female nurses being added to complete the ambulance train *personnel*.

Thus the addition of three medical officers and about thirty men to the cadres of fourteen of the general hospitals of the Territorial Force would provide for the formation on mobilization of fourteen clearing hospitals, and fourteen ambulance train detachments—*i.e.*, one to each Territorial division.

If the question of cost arises, one might suggest that the money at present ear-marked for the "water-duty" detachments laid down in the war establishments for each Territorial unit might well be devoted to this purpose. This is suggested not because one undervalues sanitation in any way, but because the War Office will not issue filter carts and horses to the Territorial Force, whilst the great majority of the annual camps are supplied with filtered water from the town mains; and because—up to now—it has proved impossible to enlist men as Territorials in any number for water-sterilising duties, which they have neither the equipment for nor the opportunity of carrying out.

It may be objected that clearing hospitals organized in this way would not be perfectly efficient units, but it must be remembered that the Territorial Force is organized entirely for home defence, and therefore the distances to be coped with from fighting zone to base would be very small compared with those of Manchuria, and that there would be good roads available everywhere even if the railroads were useless.

Thus it is possible to be content with a lower standard of efficiency than would be required in a clearing hospital for an expeditionary force, and a hospital of this moderate standard may easily be obtained at small cost to the State in the manner here indicated. Probably a very few weeks of practice and camp life would make such a clearing hospital a very efficient unit, the essential point being the presence of the nucleus of trained officers and non-commissioned officers knowing their work and having full military status.

The existing Territorial Force general hospitals would also benefit greatly by the addition of the cadres of a clearing hospital and ambulance train. The *personnel* available for drills and lectures would be increased and the scope for instruction much enlarged. At present all camp work is, strictly speaking, outside the scope of general hospital men, as they have to carry out their hospital duties in selected buildings, and instruction in the range of subjects required for sick transport would be very welcome.

The suggested arrangement would also be popular with the voluntary aid detachments, who call for trained leaders and definite objects for which to work.

Finally, the coming into existence of these fourteen clearing hospitals and ambulance train detachments would relieve the minds of those responsible for the Territorial Force medical arrangements of a great source of disquiet and anxiety.

Should this idea materialise it is suggested that clearing hospitals should train alternately with their general hospitals and with the nearest field ambulance, thus giving them an insight into both ends of their work.

The ambulance train cadres should be trained at Netley, where there is an ambulance train and hospital railway station, or failing that, at some great railway centre, such as Crewe.

When the cadres are established they should receive some portion of their equipment for educational purposes.

#### NOTE.

Having been an active propagandist of the Red Cross movement, the writer may perhaps be permitted to enumerate the functions which it seems desirable that the Red Cross Society and the Order of St. John should undertake in connection with the Territorial Force :—

(1) They should supply the additional *personnel* for the mobilisation of the cadres of general hospitals, clearing hospitals and ambulance trains ; also the equipment other than technical.

(2) Voluntary Aid Detachments could well undertake the nursing of some cases which are unfit to travel and have to be left near the battle site.

(3) Voluntary Aid Detachments could undertake all stationary hospitals, the nearest detachment being called upon to fit up suitable buildings in the town where its members reside, being well practised in the necessary arrangements during peace.

(4) Voluntary Aid Detachments could undertake the guidance

of convoys of wounded, if a Royal Army Medical Corps Territorial Officer is in command: they can only undertake the charge of very small parties of wounded by themselves.

(5) Rest stations at railways or on main roads and the like should be provided by voluntary aid detachments.

(6) Women—besides nursing, cooking, and washing—can form parties for making dressings, bandages, and clothing for the wounded, and they should organise the care of the families of those who are away on Red Cross duty.

(7) A certain proportion of women who are trained nurses should be asked to volunteer for duty with ambulance trains.

Thus there is an enormous field of utility for the Red Cross, but it is desirable that the organization of it should be carried out by the Medical Service of the Territorial Force, and for this purpose all the voluntary aid detachments should be put under the inspection of the Administrative Medical Officer of the Territorial Force Division in which they are situated, or of some one delegated by him for the purpose. In no other way can the Red Cross be co-ordinated with the medical services. At present the Administrative Medical Officer or the officer commanding a general hospital has no official knowledge whether all or any of the men for the mobilisation of the general hospital are available, or whether there is a single voluntary aid detachment within the area of the division. All this will have to be adjusted if the Red Cross movement is to have any real military value.

## United Services Medical Society.

SESSION 1910-1911.

### ADDRESS BY THE PRESIDENT,

COLONEL SIR DAVID BRUCE, C.B., F.R.S.

IN making a few remarks at the opening of a new Session, my first duty is to thank the Society for the honour done me in electing me to the office of President for the ensuing year.

This is the fourth year of the Society, and I am glad to be able to report that the number of members keeps up. These are distributed as follows :—

Navy	..	..	..	..	..	..	..	205
Army	..	..	..	..	..	..	..	275
Indian Medical Service	..	..	..	..	..	..	..	26
Territorial	..	..	..	..	..	..	..	15

There is, I believe, a feeling that there is a want of vitality in the Society, and that if the papers were more varied, the interest of the members would be stimulated. Another complaint has been made that the Society has been too purely medical, and that too little attention has been paid to the military aspects of our work. Whether there is any truth in these complaints I am unable to judge from personal knowledge, as I have been abroad during the last two years; but, granting that a little slackness has crept in, I would call on the members to come to the rescue, and, by the number and variety of the papers sent in this Session to make the Society “strike its head against the stars.” I know our two secretaries are determined to spare no effort in making the Society throb with life, and I hope all members within reach will second them in their endeavours by attending the meetings and joining in the discussions. As for those members who are not within reach, they can still take part in the good work by sending in papers, which will be taken care of and read before the Society by one of the secretaries.

The subjects which may be brought before this Society are, of course, very varied, including Surgery, Medicine, Hygiene, Organisation and Administration, on sea and land, during peace and war, at home and abroad, and it is therefore difficult, perhaps, to find a sufficient audience of medical officers interested in every paper which may be brought before this Society. The other

medical societies in London are more differentiated, and therefore feel this difficulty less.

But it must be borne in mind that it is not our business to become specialists to the exclusion of the other branches of our profession. We may be called upon at any moment to do the work of the oculist, laparotomist, bacteriologist, physicist, chemical analyst, &c., and in places where there are no experts to call in to our aid, and often not even a book to consult. At the beginning of the siege of Ladysmith the first thing I was called on to do was to sew up several holes in a small intestine which had been wounded by an accidental revolver-shot. When I look back on the same siege I see many things in the light of experience which could have been done better. For example, at that time we did not know as much about the breeding of flies as we do now. With our present knowledge I am sure we could have prevented, to a great extent, the truly Egyptian plague of flies which occurred, and the consequent increase in the spread of enteric fever. In addition to being a surgeon and entomologist, it was very necessary to be a sanitary specialist, as the water supply and the disposal of refuse in Ladysmith were also difficult to cope with.

These arguments are brought forward to induce every Naval, Army, and Territorial Officer of the medical services within reach to attend our meetings. However interested they may be in some special subject, they will, perhaps, hear something or see something demonstrated here which will be of supreme advantage to them on some future occasion.

Now what are the subjects which are most important at present to us as Service men? In the front rank still stand enteric fever and dysentery. If anything could be done to enable the soldier to escape these diseases in time of war a very great advance would be made. In times of peace, in barracks and camps, doubtless the mode of fighting typhoid fever and dysentery by means of ordinary sanitary methods is the sound one. But on active service in the field it does not seem possible to keep them altogether in hand by these means, and some other method must be added. For my own part, I have always looked to some process of artificial immunisation as the most probable way to reach the wished-for result. If the soldier could be made completely immune to enteric fever and dysentery, even for only six months, the problem would be solved. Anti-typhoid inoculation was in vogue during the last South African war, but it proved useless. Since then the method has been improved, and, according to Lieutenant-Colonel Sir W. B. Leishman's

latest figures, the case-incidence in twenty-four test units has been as follows :—

Inoculated	..	..	5·89 per 1,000
Non-inoculated	..	..	30·4 per 1,000

This substantial lowering of the case-incidence is very gratifying ; but whether this artificially induced immunity will stand the strain of active service remains to be proved.

Malaria is another malady affecting soldiers which takes a prominent position in the baleful ranks of disease, and, in spite of the epoch-making discoveries of Laveran and Ross, little seems to be done in India and the Colonies to prevent its ravages. Lately, it is true, a conference on malaria has been held at Simla, and something may now be done ; but it is thirty years since Laveran discovered the cause of malaria, twelve since Ross discovered the mode of spread, and the same length of time since Koch demonstrated the use of quinine as a means of prevention. *Festina lente !*

Plague is beginning to lose its terrors, as has been the case with cholera, now that its mode of conveyance by means of the rat-flea has been established and means of preventing it made possible. The work done, under the direction of the Lister Institute, by Lamb, Liston, and others, of the Indian Medical Service, is most illuminating and worthy of all praise.

Sand-fly fever, although non-fatal and of short duration, also causes much sickness in many parts of the world, and has been the subject of investigation during the last two years by Birt and Marett. The interesting discovery that sand-fly depends on the droppings of the wood-louse for its existence in the larval stage may open some way of prevention.

The so-called seven-day fever described by Rogers (I.M.S.) and Clayton (R.N.) is also of interest to the Navy and Army, but more work will require to be done before its true nature and mode of spread is established.

In surgery there are numerous important questions, such as anæsthetics and antiseptics on active service, and many others.

The effects of the *Spirochæta pallida* and the *Gonococcus* are still far too marked on our sailors and soldiers. A great deal could be done in the way of prevention if more determined efforts were made on the part of the military authorities and medical officers. The treatment of these diseases has progressed of late years, and there seems some likelihood of further improvement in this direction in the future.

On the hygienic side of our work there are, of course, many of the most important subjects affecting the sailor and soldier. I have been struck lately by the discovery that beri-beri is due to the polishing of rice, by which it loses the greater part of its nourishing power. It might be worth investigating, if it has not already been done, as to how much of the nourishing power is taken from wheat by analogous processes. Then, again, the question of tinned foods and their effect on health. Why did so many of us suffer from jaundice in the South African War? How best to filter water in the field. Then there is the question of clothing, and the best mode of carrying kit. Or, again, in regard to the feet: should the soldier's boot approach more to the natural shape of the human foot than it does now, or is the present shape satisfactory? The question of physical training of the soldier is also most important, and its effect on the soldier's heart.

Medical organization for war is completely altered. Questions coming under this heading are naturally of supreme importance to Service officers.

The Territorial Medical Force has been lately established in a much more serious fashion than the old Volunteer Force, and the organisation of voluntary aid societies has been put on a definite footing. We hope to have papers by Territorial officers on the special difficulties which affect their Service.

These and many other subjects ought to employ the energy and time of this Society. Much has been done, but much more requires to be done.

What is wanted is work, intelligent, persevering work, as, in my way of thinking, Nature may be looked on as something ductile, which is capable of being moulded into any shape or form by the worker who is not discouraged by failure, "but strong in will, to strive, to seek, to find and not to yield."

## THE SOLDIER'S HEART.

By **LIEUTENANT-COLONEL R. J. S. SIMPSON, C.M.G.**  
*Royal Army Medical Corps.*

It is, I think, important to ascertain how we actually stand with regard to the existing prevalence of this disease in the Army, whether this is greater or less than in previous years.

For any accurate comparison, we must first consider the possibilities of the entrance into the Army of cases originating before enlistment. We cannot, of course, have any accurate measure of these cases, but we have a record of the converse—*i.e.*, of the cases rejected on or immediately after enlistment. Generally speaking, one might assume that the greater the proportion of all recruits rejected, the smaller the number likely to be taken into the Service with existing disease of the heart. This assumes two constant factors; the degree of prevalence of these diseases among the classes from whom our recruits are drawn, and a constant standard of medical inspection. As regards the first of these, considering the average numbers of recruits examined annually, the very great variations noted can hardly be explained in this way. As regards the standard of examination, we know that it has been considerably more stringent in recent years, and similar variations have probably occurred in earlier parts of the period.

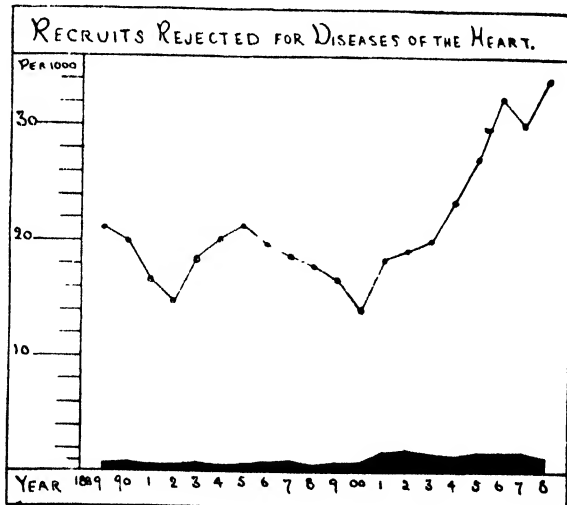


FIG. 1.

*Recruits rejected either on or within Three Months of Enlistment.*—Fig. 1 shows the proportion of all recruits examined who

were rejected on account of diseases of the heart between 1889 and 1908, either on or within three months of enlistment; the solid black shows the latter separately, and it will be observed how small this is in relation to the total rejections.

The point of interest at present is the enormous increase in the rejections from 1904 onwards, beyond any recorded in previous years. It should also be noted that the rejections within three months *after enlistment* showed an increase on previous records earlier—i.e., from 1901—and that the same steady increase has not taken place that is seen in the numbers rejected *on enlistment*. This probably points to greater care in the examination on enlistment.

(2) We have now to bring these rejections into relation to the admissions for disease of the heart. Fig. 2 shows V.D.H. and

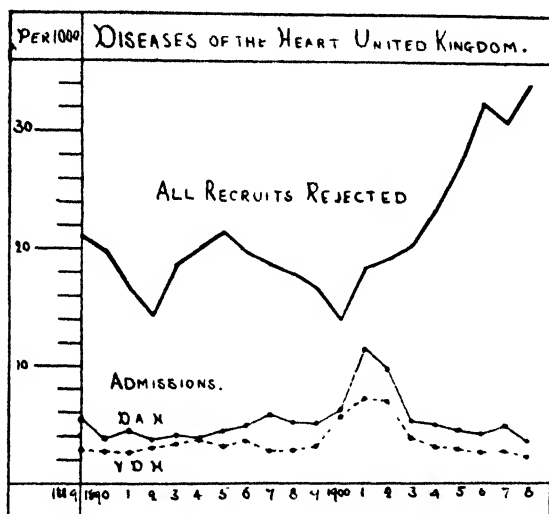


FIG. 2.

D.A.H. separately per 1,000 of strength for the same twenty years, while the rejections are shown in the thick black line.

If the admission of cases of existing heart disease forms an element in its prevalence in the Army, we should expect to find some general inverse relationship between these two curves, and in fact there is some relationship of this nature, which would be more marked but for the exceptional and heavy increase both in admissions and rejections during the war period. If, instead of taking admissions, we take the total loss by deaths and invaliding, we find

between 1899 and 1908 (the only period for which the comparison is possible) a well-marked relationship between rejections and total loss. There is, then, evidence that the prevalence of diseases of the heart in the Army is partly determined by their prevalence among the classes from which our recruits are drawn.

A point also shown by the figure is the very close relation between the annual admission-rates for V.D.H. and D.A.H. Those causes which tend to increase the one also increase the other.

(3) *The Comparative Prevalence at different Periods.*—Apart from the marked increase during the war period, perhaps due to admissions among men sent home for other diseases, the curves do not show any very marked differences. Since and including 1903 there has been a small but steady fall in both classes of disease, but the prevalence now of D.A.H. is about the same as that between 1890 and 1894, while that of V.D.H. shows only a small decrease from the prevalence over that same period. The greater number of rejections and greater care in examination appear to influence the prevalence at least as much as any other factor.

(4) *Influence of Age.*—Taking the records of the Woolwich Garrison between 1890 and 1906, 294 cases were invalided (*i.e.*, over three months' service) for diseases of the heart—235 for V.D.H., 59 for D.A.H. Woolwich is, of course, a great training school for young soldiers, and there is also a large proportion of older men. The total cases are probably sufficient to give a fairly close approximation to the actual facts. The result is shown in fig. 3. The

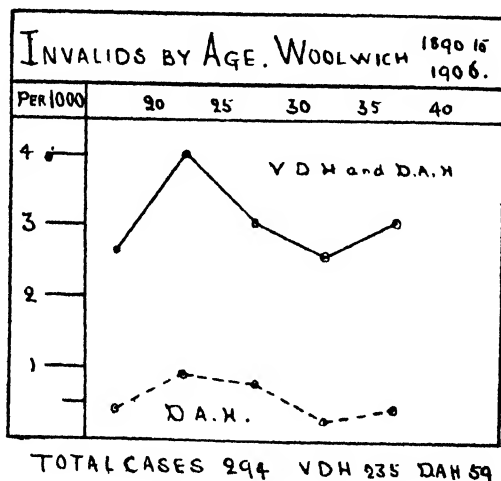


FIG. 3.

highest incidence-rate is definitely between 20-25, falling to the group 30-35. Here, again, the similarity of the two curves is evident.

(5) *Influence of Service.*—The same cases are distributed according to service in fig. 4. This shows very definitely the preponderance

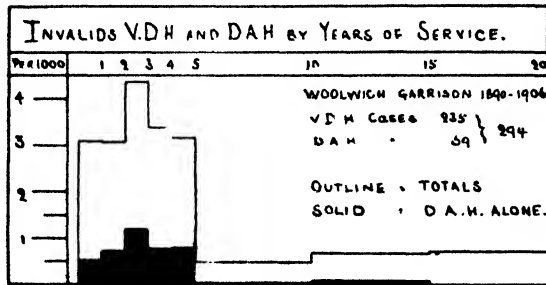


FIG. 4.

in the third year of service, both as regards V.D.H. and D.A.H. These diseases are seen to be practically limited to the first five years of service. The period 20-25 corresponds very well with the third year of service. It gives time for the effects of illness contracted after enlistment to show themselves, and it may be noted here that in Woolwich rheumatism of all types is fairly common, and that there is a persistent prevalence of sore throat and tonsillitis.

(6) *Incidence during the South African War.*—As a question was asked regarding this point, the following figures have been extracted, relating to Warrant and N.C.O's and men. During the decade 1888-97 the admission-rate in South Africa for all diseases of the circulatory system was 9·1 per 1,000, and the death-rate 0·32.

During the South African War the admission-rate was 19·67, the death-rate 0·38; of this, V.D.H. contributed 6·34 and D.A.H. 9·51. That is, the admission-rate was about doubled, while the death-rate remained about the same. The only incidence in South Africa above that of the South Africa War was in 1879-80 (also a war period) 22·4 and 20·9 respectively.

Taking all circulatory disease according to classes, the following is the series :—

Men—Imperial Yeomanry..	..	24·6	per 1,000.	
Regulars and volunteers	..	21·8	"	
Colonials	..	9·7	"	
Officers—Regulars and volunteers	..	7·5	} These three are indistinguishable.	
Colonials	..	6·1		
Imperial Yeomanry..	..	5·6		

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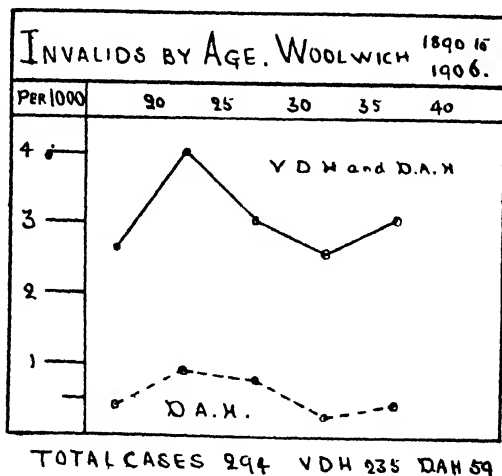


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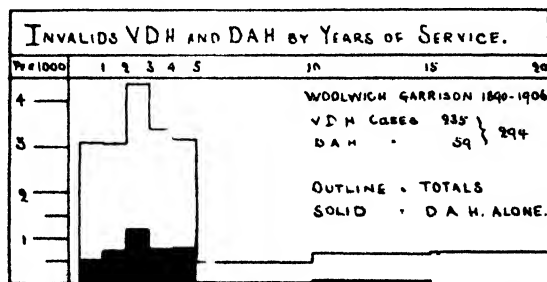


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With regard to the hypothesis that our method of training the soldier is the cause of the prevalence of disease of the heart in the Army, attention may be drawn to the fact that the incidence rate among the Imperial Yeomanry, who received no training of the type to which the regular soldier is subjected, was greater than among the Regulars and Volunteers. This is additional evidence that the method of training is at its worst only a subsidiary element in the production of these diseases.

(7) *Clinical Features of D.A.H.*—The cases of D.A.H. which have been examined presented certain common symptoms:—

(a) The hands, sometimes the feet, are blue and congested, cold and often clammy. The feet are always cold. These conditions are usually worst in the morning. The patient looks limp and has no energy; the muscles are often badly developed and lack tone. The skin temperature is lower than normal.

(b) The reflexes are usually considerably increased, notably those of the arm, and the reaction spreads beyond the group of muscles more immediately concerned and to which it is confined in a normal reflex.

(c) Pulse-rates are very variable; even during an observation excessive acceleration may occur, though they usually fall if the observations are prolonged. They vary greatly with position or exercise, which may increase or diminish the rate.

(d) Arterial pressure is relatively high, about 140 mm., and there is no constant relation between exercise and pressure; there may be a rise or a fall after exercise. Pressures vary very rapidly; the first is usually too high and the patient has to become accustomed to the observation.

(e) The heart presents no abnormality: the sounds are usually pure, though in one or two cases evanescent murmurs flitting from valve to valve have been observed.

(f) Subjective symptoms are very variable: the patient, however, rarely of himself complains of his heart. Fainting or giddiness on parade is perhaps the most constant symptom, but many of the cases are only discovered in the course of a routine examination.

(g) The clinical evidence shows there is an irregular, usually excessive, response of the skeletal muscles to stimuli, and that the same irregularity and excessive response are found in the vasomotor system.

(h) These cases are not peculiar to the Army: I saw many of them in the Arsenal between 1891 and 1895.

(8) *Treatment.*—Detention in hospital, and especially rest in bed,

will make these cases worse. At the Royal Herbert Hospital light work in the garden has produced some improvement; at Millbank graduated exercises, especially walking, undoubtedly did good. Hot baths produce a temporary lowering of pressure, which may last for twenty-four hours, and the patients themselves feel better for the baths, except in those cases where it makes them sick and faint. Tonics are of no use.

(9) *Prognosis*.—As regards fitness for active or foreign service, most of these cases seem to me to be hopeless. They appear to do better in civil life, probably because they have more freedom in the way their work can be done.

(10) *Prevention*.—As the condition appears to be congenital, or at least developmental, prevention after enlistment is probably impossible. No doubt some improvement in their condition might follow special methods of training after enlistment, but there seem to be grave doubts as to the permanency of this improvement. One may here adduce the extent of the breakdown during the South African War.

*Postscript*.—Certain points raised in the discussion may be referred to. The effect of the "position of attention" and of the sharp word of command appears to me to fall into the same category; they both produce a condition of strain—partly bodily and partly mental. Our observations on these cases showed that anything producing strain of either type was followed by a variation in blood-pressure and pulse-rate. But my belief is that this effect is due to the previously existing condition of the patient, and not to the external agent alone. As regards the effect of clothing, I do not think enough stress is laid on the importance of perfect freedom round the neck. A wide collar is no use if the fitting of the tunic is so bad that the collar is pulled down and jammed over the root of the neck, so that the hook presses on the throat below the larynx.

## OBSERVATIONS UPON DISORDERED ACTION OF THE HEART, SO-CALLED "SOLDIER'S HEART."

By M. S. PEMBREY, M.D.

THE question of the "soldier's heart" is of so much importance and interest that a free discussion cannot fail to be of value. The whole subject requires to be reopened in the light of recent work upon the physiology and pathology of the heart. The range of the discussion must be a wide one, for "disordered action of the heart" is not a simple condition due to any one cause. The discussion must be free, for it is only by considering different views and testing them by further observations and experiments that advance will be made.

The clinical aspect of the disorder, the frequency of its occurrence, and its distribution among recruits and trained men, have been discussed by Lieutenant-Colonel Simpson; my part in the discussion is to bring before the Society the physiological aspect of the question.

There is no doubt that a condition of disordered action of the heart occurs among men who have never served in the Army, but it does not follow therefrom that the prevalence of the condition among soldiers is due to failure to detect it among the numerous candidates who present themselves to the recruiting officer. The recruits are selected men; it may be that they include many who have been unemployed, and few of the best physical types of the labourer, but, still, they are men selected as likely to bear the training of a soldier. The Navy takes a large number of boys as recruits, and therefore the condition is not comparable to that of the Army; but nevertheless it is important to recall the fact that there is no cardiac disorder known as the "sailor's heart." The distribution of the cases of "soldier's heart" over the first three years of service also supports the view that there are conditions in the life of the soldier which favour disordered action of the heart. The investigation of these conditions is a physiological problem.

The rhythm of the heart-beat and the conditions which affect it may now be considered. The heart is a muscle, and, as in the case of other forms of muscular tissue, is influenced by its nerves. It is unnecessary, therefore, to discuss here the myogenic and neurogenic theories of the heart-beat. The discovery of the auriculo-ventricular bundle by Stanley Kent and His has given additional significance to the work of Gaskell, and throws much

light upon pathological conditions of the heart, as is so well shown in the investigations of James Mackenzie.

The rate of the heart-beat varies greatly in different subjects, even when they are healthy and as far as possible under similar conditions. There is no rate which can be given truly as the normal. Many physicians forget that they do not see the cases which are necessary for the determination of the range of the pulse in health; they forget that "only the sick need the physician." We must look to the medical officers of the Services for the determination of this range, for at their command they have unlimited material. Lieutenant-Colonel Deane has made numerous observations of much value in this connection. Other fields of investigation are the medical schools, and these have received attention, but not to the extent that is necessary.

The range of the pulse-rate in different healthy young men at rest is from 45 to 90, and there is no evidence that even this extensive range is a rigid one.<sup>1</sup> Dr. Michell has examined a large number of undergraduates at Cambridge, including 1,200 rowing men, 410 football players, and a few running men; he found for the average rates of the pulse the following values: In first year of residence, 69; second year, 64·5; and third year, 56·8. The rate in some men was as low as 46. At Oxford Miss Buchanan found the rate of pulse to vary between 44 and 80 per minute in about forty-five undergraduates, chiefly athletic men. In 174 observations, made by Captain L. E. L. Parker, R.A.M.C., and myself, the range of the pulse in soldiers at rest was 52 to 110; the determinations relate to fifteen men only, but were made upon thirty-six different days. The slow pulse is generally found in the men who are physically the fittest subjects, and under the influence of progressive training the frequency of the pulse at rest is reduced.

Of the conditions which quicken the rate of the pulse the most important is muscular exercise. The pulse of healthy men may be as rapid as 185 per minute immediately after strenuous exercise, and there is little doubt that physicians have often taken too low a figure, owing to the fact that in the trained man the acceleration of the pulse begins to decline directly the work ceases. A march of seven miles in drill order on a hot day will double the rate of the pulse of a healthy but imperfectly trained man.

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<sup>1</sup> See Guy, article "Pulse," in Todd's "Cyclopædia of Anatomy and Physiology," vol. iv., p. 184.

## 720 *Observations upon Disordered Action of the Heart*

Temperature is another cause of acceleration of the pulse, and becomes a very important one in view of the clothing of the soldier. It is necessary to consider not only the internal temperature taken in the rectum, but also the surface temperature of the skin and the temperature and moisture of the air, as indicated by a wet-bulb thermometer. The following data are taken from the Second Report of the Committee on Physiological Effects of Food, Training and Clothing on the Soldier; they show the influence of marching on a hot and a cold day:—

Number of observations	INCREASE IN PULSE			RISE IN RECTAL TEMPERATURE, DEGREES F.			LOSS OF MOISTURE IN GRAMMES			INCREASE IN WEIGHT OF CLOTHES IN GRAMMES			EXTERNAL TEMPERATURE, DEGREES F.	
	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.	Dry bulb	Wet bulb
4	84	52	62	2.3	0.6	1.4	2,390	1,140	1,816	640	60	320	79	67.5
4	24	8	14	1.6	0.0	0.8	555	300	419	40	0	27	45	38

The march of seven miles was over the same road, and the four men, who carried a load of 6 kilogrammes each, were the same in each experiment. The differences in the acceleration of the pulse and the sweating on the hot and cold days are very striking.

The heart is influenced by the reflex tone of the muscular system, both the skeletal and the circulatory. The blood-vessels of the skin are dilated when more blood is sent to the skin to be cooled, and at the same time during work more blood is needed by the muscles. The dilatation of the blood-vessels will lower the blood-pressure and therefore for the maintenance of an efficient circulation the heart must contract more frequently or more forcibly. It follows, therefore, that clothing which unduly prevents the evaporation of sweat and the cooling of the skin will throw an extra stress upon the heart. On the other hand, exposure of the skin during muscular work will contract the cutaneous vessels by the cooling effect of the evaporation of the sweat and thus raise the pressure of the blood. Moreover, a general effect will be produced upon the nervous system by the impulses arising from the skin, which is the largest sensory area of the body.

Athletes are lightly clad during exercise, for they have learnt from experience that they are far more efficient and suffer less discomfort under such conditions. The farm labourer or navvy, when he works hard on a warm day, takes off his coat and waist-coat and turns up his shirt-sleeves, and any employer would hold suspect the man who did not. In respect of clothing the soldier differs from all civilian labourers; he works at a disadvantage and throws a greater tax upon his heart. It is true that with the new

equipment the soldier can now open his coat and shirt and make the conditions more favourable for efficiency, but his belief in the importance of conventional ideas of smartness is against him. This influence of clothing upon the heart, circulation, and loss of moisture has not only been proved by experiments upon soldiers, but is one of common experience.

The soldier is under another disadvantage as compared with the civilian: he must carry the load of his equipment in such a manner that his hands are left free for fighting. The straps of his equipment may impede considerably the freedom of his respiratory muscles and thus deprive his heart of some of the aid of the respiratory pump, which assists the passage of the blood from the right to the left side of the heart. The equipment, moreover, often hinders the free circulation of air through the clothing, and thus the evaporation of sweat and the cooling of the skin are diminished. With the new equipment the conditions are much more favourable than they were with the old.

The assistance naturally afforded by the respiratory movements to the circulation of the blood is diminished in the soldier by the constrained position assumed when he is trained in the gymnasium and on the barrack square. The distended chest was long ago rightly condemned by the medical officers of the Army, but, as in the case of other injurious fashions, it is difficult to effect reform. It is fortunate that among sailors this artificial bearing with a distended and rigid chest has never been approved; the freedom of their gait has become as marked a characteristic as their loose clothing.

Another factor of importance is the demand in the gymnasium and on the barrack square for uniformity. There is no finality in style; it is impossible to stereotype any muscular action, for in each man there are peculiarities, in each a personal equation. Over and over again athletic contests have shown victory gained by men whose style was condemned by all the critics. Too rigid an insistence upon uniformity in the performance of gymnastic exercises, especially in the early stages of training, imposes a greater tax upon the recruit, and observations have shown that flurrying and hustling will disturb the control of the heart's action and of the voluntary muscles in healthy men.

Alcohol, smoking, and vice have been looked upon as important factors in the production of disordered action of the heart. There is very little doubt that such habits do contribute, but undue stress must not be laid upon them, for there is no evidence at the present

time that they are more prevalent among soldiers than among civilians and sailors. Excessive smoking is a well-known cause of disordered action of the heart, and it is surprising that smoking on the march has been allowed. The athlete does not expect this indulgence during training, nor does the labourer during his ordinary work.

A comparison of the conditions under which a soldier works shows that they are more unfavourable than those of the outdoor labourer or sailor. The soldier does not enter the gymnasium as a boy, at a stage when he would be in a plastic condition and able to accommodate himself to unnatural and constrained postures. The soldier marches under unfavourable conditions as regards clothing, equipment, and load. All of these drawbacks throw an extra tax upon the heart, and it is not surprising that some men fail to meet it, especially if the training is not progressive. The law of excitation shows that the greatest effect or disturbance is produced by a sudden change; by slowly progressive training a man can, even under unfavourable conditions, perform with little risk work which would be impossible without such training. There is very little doubt that Clifford Allbutt is correct in his view that a properly trained person, man or boy, need never fear cardiac strain.

In conclusion, I wish to say one or two words upon the question of treatment and prevention of disordered action of the heart. My experience of the "soldier's heart" is naturally limited, but, from the cases I have seen with Lieutenant-Colonel Simpson, I am convinced that hospital life is not suitable for such cases. The heart is a muscle. If it is strained, rest may enable it to recover; but if it is only weak and disordered in action, rest will make it weaker still. Inaction and the knowledge that his heart is not right have a bad effect upon any man. The heart is improved by progressive exercise, and it is known that many men discharged for disordered action of the heart have become efficient workers in civil life. It is possible to pay too much attention to a rapid and irregular pulse after exercise, and it is probable that men with "soldier's heart" would be better treated if they were classed, not as cases of heart disease, but as men of inferior or defective physique who require a special training and discipline.

Colonel Wardrop and Colonel Cottell maintain that many of the men discharged for disordered action of the heart might be retained and become useful soldiers. The saving of men and money would be a great gain to the State; the advantage to these

men would be as important, for they would not leave with the impression that they were unfit for work and the victims of heart disease and military service. The Army would also gain, for the criticism sometimes made that men are first broken down and then discharged would fall to the ground.

The prevention of disordered action of the heart could no doubt be extended by more attention to progressive training in the gymnasium and in route marching. The soldier would profit by more constant and harder work, as against work suddenly undertaken without adequate training.

### DISCUSSION.

Dr. JAMES MACKENZIE asked whether men were admitted to hospital or rejected for service because they had a murmur, or because they broke down; many healthy hearts did show a murmur, and he thought the rejection of recruits for a murmur alone was a mistake.

Surgeon-General BRANFOOT attributed disordered action of the heart to cigarette smoking.

Dr. MOIR asked whether anyone had noted a connection between tall men and disordered action of the heart; he thought small men were likely to make better soldiers so far as the heart was concerned. An abnormally slow pulse was bad: such cases were liable to syncope.

Lieutenant-Colonel DEANE said he no longer believed that the position of attention had anything to do with soldier's heart, nor overtraining, since the men affected were soft, flabby men. Swedish exercises were no better than any other. He thought that clothing might have something to do with the causation.

Lieutenant-Colonel MELVILLE suggested that the apparent increase in heart diseases in the third year of service might be attributed to the rejection of men coming up for foreign service. He attributed soldier's heart to the over-exercise of recruits before they were properly fed; and suggested that recruits should be fed up for a month before any serious work was given to them. It was necessary to reject men with heart murmurs, since one could not separate injurious from harmless murmurs in a recruiting station.

Major W. S. HARRISON referred to the work of Davy in 1876. Davy attributed soldier's heart to the compulsory position of attention, which, as he pointed out, was accompanied by an habitual semi-expansion of the chest and loss of action of the respiratory pump. He also referred to a personal experiment where he found that his pulse-rate was increased by fifteen beats when he put on a tight jacket.

Lieutenant HAYES had made some experiments for Major Harrison,

## 724 *Observations upon Disordered Action of the Heart*

counting the pulses of men "standing easy" (in which position it was impossible to expand the chest in the soldier's habitual manner) and after five minutes' standing at attention; in twenty-nine observations there was an average increase of 7.5 beats in the pulse-rate after standing at attention, the maximum increase being twenty beats, while in only three instances of the twenty-nine was there no increase in the pulse-rate.

Fleet-Surgeon HUME thought that Marines suffered more from heart trouble than bluejackets, and attributed the difference to the better feeding of the latter.

Colonel Sir DAVID BRUCE said that the distinction between valvular and functional disease of the heart was often a matter of idiosyncrasy in diagnosis. He related a personal observation when shooting. Whilst he was wearing his coat he was much oppressed and almost fainted, but when he removed his coat he was able to shoot for the rest of the day in comfort. He suggested that the proper way to solve the etiological problem was by means of a series of well-conducted experiments.

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## Clinical and other Notes.

### A CASE OF TRAUMATIC RUPTURE OF THE ILEUM— OPERATION TWENTY-FOUR HOURS AFTER THE INJURY —RECOVERY.

By CAPTAIN F. W. LAMBELLE.

*Royal Army Medical Corps.*

At Bridlington, about 7 p.m. on July 9th, 1910, No. SS. 902, R.L., Northumbrian T. and S. Column A.S.C. (T.), was kicked in the abdomen by a horse. He was helped back to his tent, but as there was no external wound it was thought that there was no severe injury. He felt sick, and vomited frequently all through that night. The following morning his condition was regarded as unsatisfactory and he was brought to York by motor car, a distance of some forty miles.

At 3 p.m. on July 10th he came under my care; his condition then was as follows: very ill and restless, presenting a facial appearance of internal hæmorrhage and severe shock. On inspecting the abdomen only a very slight abrasion was to be found, 3 inches below and to the left of the umbilicus. The abdomen was everywhere rigid, tender and motionless, showing that acute peritonitis had commenced and was becoming general. There were signs of gas and fluid in the peritoneal cavity.

At 6 p.m. the abdomen was opened through the right rectus sheath from the umbilicus to the pubes; distended small intestines prolapsed into the wound. On examining the gut three ruptures were found in the ileum. At one of these the bowel was almost completely severed, except for an inch of tissue at the mesenteric border; the second rupture extended half-way round the gut; the third at the free border of the gut would about admit an index finger. Bleeding was taking place from the injured mesenteric vessels. The peritoneal cavity contained much blood and bowel contents. All attempts at emptying the distended gut failed owing to the rigidity of the intestinal wall due to the acute peritonitis. At the end of the operation great difficulty was experienced in returning the gut and closing the abdominal wall.

The largest rupture was repaired by cutting away all damaged tissue and making an "end to end" anastomosis, two layers of fine silk suture being employed without any mechanical appliance. The other ruptures were repaired by paring and suturing. An abundance of hot normal saline solution was used for flushing out the peritoneal cavity and three large drainage tubes for the right and left iliac fossæ and the pelvis were inserted.

One pint of saline solution was injected into the subcutaneous tissues

of the right axillary region just before the patient was removed from the operation room.

July 10th, 10 p.m.—The patient has recovered from the effects of the anæsthetic; the following treatment was ordered:—

(1) Coffee and saline enema *per rectum*, half a pint every fourth hour; (2) nothing by the mouth; (3) the following mixture to be given every fifteen minutes until midnight, then every half-hour until 4 a.m., and afterwards every hour:—

R	Liq. morphia hydrochlor.	..	..	..	℥ xxiv.
	Tinct. belladonnæ	..	..	..	℥ iii.
	Tinct. aurant...	..	..	..	ʒii.
	Aq. ad. ...	..	..	..	ʒiii.

One teaspoonful for a dose.

July 11th, 2 a.m.—The patient is restless, cold, with feeble pulse and hiccough. Temperature 97·6° F., pulse 136, respiration 32. Condition improved after coffee enema.

9 a.m.—Restless and cold. Temperature 96° F., pulse 136. Ordered a dry hot-air bath, temperature 90° F.

1 p.m.—Patient's temperature has risen to 99·2°, pulse-rate now 132, and with the reaction he has begun to vomit copiously without effort the dark green bile characteristic of acute peritonitis. Hot water given in large quantities to aid the evacuation of the bile and mucus in the stomach.

6 p.m.—Temperature 100·4° F., pulse 132. His condition now seems to be a little more hopeful, but he is still vomiting. Hot-air bath discontinued.

10 p.m.—Continuous saline injection *per rectum* begun.

July 12th, 4 a.m.—Continuous saline stopped. Temperature has again fallen. Temperature 98° F., pulse 126. Hot-air baths again employed.

10 a.m.—Temperature 99° F., pulse 110, respiration 28. Some improvement in his general condition. Still the same copious vomit, hiccough and flatulency. Small feeds by the mouth, 1-ounce quantities hourly. Tea, fresh lemonade, champagne, beef-tea in rotation.

6 p.m.—Temperature 100° F., pulse 116, respiration 24. Hot-air bath discontinued.

July 13th, 2 a.m.—Vomiting and hiccough have stopped and the patient has fallen into a sound sleep.

10 a.m.—Temperature 98·8° F., pulse 92, respiration 26. The bowels have moved naturally. Mixture of the 10th and the rectal saline enemata have been discontinued.

July 14th.—Decidedly better. He has slept all last night. Bowels open naturally, four times. Temperature 98·8° F., pulse 84, respiration 20. Now given 2-ounce feeds. Milk and hot water, beef-tea, and tea. Fresh hot lemonade *ad lib*.

July 15th.—Temperature 98·8° F., pulse 76, respiration 24. Doing well.

Subsequent progress uneventful. The patient made an uninterrupted recovery, the operation wound healed by second intention and gave a sound, strong scar. He was fit to leave hospital on September 3rd, 1910.

*Remarks.*—This case was a desperate one, and I attribute the recovery in no small measure to the after-treatment employed, especially the use of the hot-air bath, which by conserving the body heat tides the patient over dangerous periods of shock and threatening collapse. The use of opium as a stimulant and not as a narcotic is worthy of consideration. So much has been said in our time about opium in abdominal cases to its detriment that its usefulness is almost forgotten. The physicians of fifty years ago used it with advantage, and knew that where one-sixth of a grain of morphia would do harm, this amount split into ten or more doses and given at regular intervals did great good. In this case, after some fifty hours the acute symptoms of peritonitis—viz., hiccough, flatulency and effortless vomiting—ceased and the bowels moved naturally a little later.

#### REFERENCES.

(1) "Heat in the Treatment of Shock," by H. F. Waterhouse, F.R.C.S., *British Medical Journal*, July 9th, 1910.

(2) "A Farewell Retrospect," by John Kent Spender, M.D., *British Medical Journal*, March 22nd, 1902.

### NOTES ON SURGICAL OPERATIONS IN THE MILITARY HOSPITAL, EDINBURGH.

By CAPTAIN E. G. FRENCH.

*Royal Army Medical Corps.*

*Cases of Appendicitis.*—Gunner F. was admitted to hospital from an out-station, suffering from appendicitis. He had been ill for some days before reporting sick. The operation was performed soon after admission. On reaching the appendix it was found to be in a gangrenous condition, and the intestines showed signs of general peritonitis. There was a considerable amount of pus in the region of the appendix, and the intestines were greatly distended with gas. The appendix was removed and the pus mopped up with gauze pads. The wound was closed, with the exception of the lower portion, in which a large Paul's tube was inserted. The patient was in a desperate condition, and was kept alive by saline injections into the rectum and axilla until the fifth day after the operation, when death took place.

Driver S., admitted suffering from severe pains all over the abdomen. Appendicitis was diagnosed and an operation performed soon after his admission. On reaching the appendix, it was found to be gangrenous and ruptured towards the tip, a concretion the size of a small pea adhering to the edge of the rupture; there was also evidence of localised peritonitis. A fairly large abscess was evacuated. The appendix was removed and the pus mopped up with gauze, after which the wound was irrigated with warm saline solution, and then closed layer

by layer. It healed by primary union, and after a month at the convalescent home, the patient returned to duty.

Private F., admitted to hospital suffering from pain in the region of the appendix. On exposing the appendix in the usual way it was found to be matted to the surrounding structures and its removal impossible without injuring the intestines. An abscess was found behind the appendix; this was drained and the wound closed excepting at the lower angle where a drainage tube was inserted. The abscess drained satisfactorily and the wound closed after a short time. He is now quite well and has returned to duty.

*Cases of Inguinal Hernia.*—In eight cases a modified MacEwan's method was performed. All of them healed by primary union, with the exception of one which developed a small hæmatoma; a couple of stitches were removed and the clots turned out, the wound soon closed.

*Tubercular Disease of the Left Knee; Amputation.*—Pensioner McK. was admitted to hospital suffering from tubercular disease of the left knee-joint. He had five discharging sinuses, three on one side and two on the opposite side of the joint. Two years ago an arthrectomy for tubercular disease was performed in a military hospital. On recovering from this he was invalided out of the Service. He stated that he always suffered pain in the joint on trying to walk, and life became a burden to him. The sinuses appeared seven months ago, and discharged quite freely. After some considerable attendance at a civil hospital, he was ordered into the Military Hospital, Edinburgh, with a view to further treatment. He had a hectic temperature and the discharge was profuse; he had also lost 2 stone in weight. Five probes were introduced into the sinuses, and an X-ray photo was taken of the joint. It was then seen that the sinuses communicated with the joint and that both condyles of the femur showed marked evidence of tubercular disease. He was advised to have the limb removed, and he consented. It was accordingly amputated at the middle third of the thigh, long anterior and short posterior flaps. A point of interest in this case was an abnormal profunda artery, which was situated very close to the femur and gave us a deal of trouble in securing it. The wound healed by primary union, with the exception of one stitch which suppurated and formed a small sinus. This closed after a time and the stump is now a firm one with the cicatrix retracted well to the posterior aspect of the limb. He has gained over a stone in weight since the operation and has been fitted with an artificial limb.

*Fractures.*—A boy aged 16 was admitted from an out-station suffering from dislocation of the left elbow-joint, the result of a fall from a bicycle. An X-ray photo was taken, which showed a small piece of bone wedged in the joint. The internal lateral ligament of the joint was ruptured, and the ulnar was out of its normal position. The joint was opened and it was found on examination that the small piece of bone was the inner border of the trochlear surface of the humerus. This was firmly wedged into the joint, and had to be removed with Lion forceps. The joint was

closed and the wound healed by primary union. The arm was put up in a splint at right angles, and passive movement of the elbow-joint started on the fourth day. He is not able to straighten the arm to the full extent, but all the movements are good and the limb is quite useful. Massage was carried out daily.

Private A. was sent into hospital from an out-station with a diagnosis of fracture of the elbow-joint, the result of a fall from a fence. The elbow was fixed and any attempt at passive movement caused him great pain. An X-ray photo was taken of the joint, and it could be seen that there was a fracture of the internal condyle of the right humerus. An incision of about 3 inches in length was made over the site of the fracture and the piece of bone which had been pulled down by the flexor muscles of the forearm was carefully removed. The wound was closed and the arm put up in a splint at right angles; on the third day the splint was removed and passive movement started and continued daily. The wound healed by primary union. He is now able to straighten his arm to the full extent, and all the movements are good.

*Empyema.*—Private R. was transferred from an out-station suffering from pain in the left side of the chest and a hectic temperature. He had recently recovered from an attack of pneumonia. Two days after admission a large swelling made its appearance in the interval between the seventh and eighth ribs, in the mid-axillary line. An exploring needle was introduced and pus was withdrawn. The patient was prepared for operation and 3 inches of the eighth rib in the mid-axillary line removed. Pus to the extent of seven pints was allowed to come away slowly. There was a good deal of collapse of the lung. A biflange drainage tube was inserted; the discharge was very profuse for the first five days, and the dressings had to be changed three times daily. The discharge gradually grew less and the patient improved rapidly in his general health. The wound healed, and the periosteum which was left behind at the operation formed new bone and filled the opening. He was in an emaciated condition on admission, but is now looking quite fit and has put on a stone and a half in weight. He has been sent to the convalescent home before returning to duty.

*Mastoiditis.*—Lance-Corporal P., admitted to hospital suffering from a discharge from the right ear associated with a good deal of pain. He was treated for two or three days with local remedies, but the pain increased instead of getting better. On the third day the pain became very severe over the region of the mastoid process. On examination there was slight redness and tenderness on pressure. He was prepared for an anæsthetic and Schwartz's operation was performed; a curved incision was made behind the ear down to the bone, the ear was pulled well forward and the periosteum detached. The bone was chiselled away down to the mastoid cells. On reaching the cells there was evidence of pus formation. All the cells were completely scraped away and the cavity of the wound stuffed with sterilised iodoform, and allowed to granulate,

the wound being dressed daily. The discharge from the middle ear stopped immediately and his temperature fell to normal; the pain also disappeared entirely. The wound granulated very rapidly and had completely closed before he was discharged from hospital. His hearing has not been impaired and he is now doing duty.

#### SARCOMA OF THE UPPER JAW.

Photo of Ex-Pensioner D. T., taken on October 14th, 1910, whose case was reported in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. xiv., p. 316.



An extensive round-cell sarcoma of the upper jaw was removed on January 12th and on March 2nd, 1909; it was followed by recurrence, the site of the growth precluding any operation. Treatment by Squire's trypsin and amylopsin apparently effected a cure, and it is gratifying to note that there has been no further sign of any recurrence. The man now is in robust health.

## NOTE ON RE-INOCULATION AGAINST TYPHOID FEVER.

BY LIEUTENANT J. DU P. LANGRISHE.

*Royal Army Medical Corps.*

It has been stated by Netter that a small dose of anti-typhoid vaccine is sufficient to re-establish immunity in those previously inoculated against typhoid fever. In consequence of this I decided to carry out an investigation into the effects produced on the specific agglutinins by re-inoculations with single small doses of varying strengths on different individuals.

I therefore selected about a dozen men who had been inoculated together two years previously with the same vaccine, and in response to a call for volunteers from amongst their number five expressed themselves as willing to undergo the experiment. A sample of blood was first taken from each and the end-points of the agglutinating power of their sera determined. As will be seen from the table, they each gave the same low reaction. They were then given doses of vaccine varying from 0.125 cc. to 0.5 cc. The resulting malaise and local reaction were not observed, and when seen a few days later the "subjects" stated that they had experienced little or no inconvenience beyond slight headache and a "sore arm." The emulsion of Eberth's bacillus used in the subsequent agglutination tests was that prepared by Marck under the direction of Professor Ficker, of Berlin, and called by the title of "*Typhus-diagnostikum*."

Subject No.	Dose of vaccine in cc.	20 days after	30 days	3 months	5 months	7 months	8 months	Reaction prior to re-inoculation
1	0.125	1 in 40	1 in 600	1 in 800	1 in 320	1 in 320	1 in 240	1 in 20
2	0.25	1 in 80	1 in 320	1 in 800	1 in 320	1 $\pm$ 80	1 in 40	"
3	0.25	1 in 80	1 in 320	1 in 800	1 in 160	1 in 80	1 in 80	"
4	0.375	1 in 40	1 in 200	Absent	1 in 80	Absent	Neg.	"
5	0.5	1 in 80	1 in 800	1 in 1,000	1 in 240	1 in 240	1 in 320	"

It will be seen from the above that there was a very sharp rise in each case from the twentieth to the thirtieth day; after this the end-point rose more slowly to the third month, when it apparently reached the maximum, and then fell quickly in the fifth month, to a more or less constant level, prolonged until the eighth, in which the last observation was made.

A point of considerable interest in the results is the individual variation of the agglutinating powers at the same period. Subject No. 4, whose agglutinins have been low throughout and entirely absent in the eighth month, shows a sharp contrast to No. 1, in whom they have maintained a high level. The latter is a robust, healthy individual, who has not had a day's sickness, while the former is a debilitated worshipper of Bacchus. His first absence was due to an attack of malarial fever, and on the second occasion he was away recruiting his health at a hill station. The remaining three are all sound, healthy men.

Although so few cases have been investigated there would appear to be some ground for concluding that a small dose of vaccine administered two years after the first inoculation is sufficient to re-establish the specific agglutinins at a high level. It would be interesting to learn if others have had the same experience, as the advantages of re-inoculating with one dose in place of two are obvious.

# A CASE OF CONTINUED FEVER ASSOCIATED WITH THE PRESENCE OF A BACILLUS RESEMBLING *BACILLUS COLI* IN THE BLOOD, AND COMPLICATED WITH MALARIA (RAWALPINDI, INDIA).

By CAPTAIN R. E. U. NEWMAN AND MAJOR F. SMITH, D.S.O.

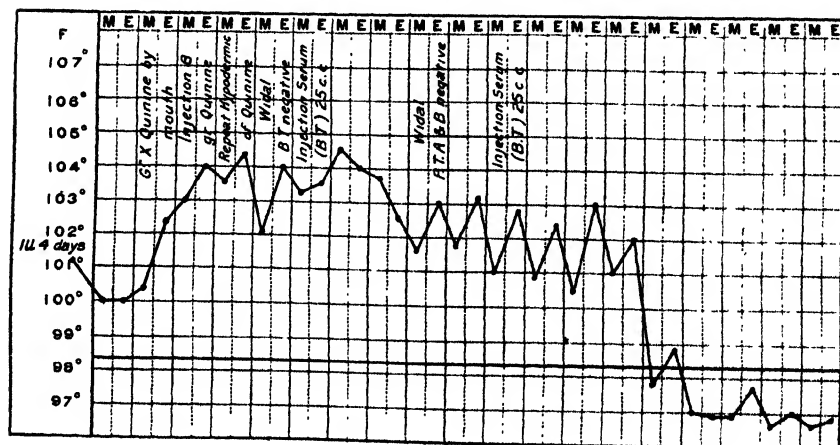
*Royal Army Medical Corps.*

THIS was a case of typhoid-like fever of the constipated type, in which there was clinically nothing very unusual except a copious eruption of smallish papules, fading on pressure. The spots were first noticed on the abdomen and back, afterwards they were to be seen over the whole body. The tongue was much furred, but moist. There was frontal headache, and pains in the back and limbs; the neck muscles were stiff and painful, and there was slight sore throat.

On the day following admission malarial crescents were found in the blood. Quinine was given hypodermically and by the mouth. Whey diet was ordered.

The Widal examination with *Bacillus typhosus* proved negative in dilution 1 in 10 on the tenth day of illness, and on the fourteenth day of illness there was no Widal reaction with *B. paratyphosus* A and B. Various diseases were discussed in connection with the case, but eventually it was styled "Pyrexia of Uncertain Origin."

The following chart shows the character of the fever:—



Blood taken from a vein on the eleventh day and incubated in bile broth in the divisional laboratory showed a pure growth of a non-motile bacillus, which formed red colonies on bile-salt neutral-red lactose agar plates. The bacillus was completely agglutinated by the patient's serum in a dilution of 1 in 320, and showed a definite positive reaction in a dilution of 1 in 640. It was not agglutinated by a control serum. The stock *B. coli* did not react except in a slight degree with the patient's serum.

The behaviour of the bacillus in various media was as follows :—

Broth	=	Even turbidity.
Agar	=	Smooth whitish surface.
Peptone water	=	Indol.
Milk	=	Acid and coagulation.
Neutral red broth	=	Fluorescence.
Lactose	=	Acid and gas.
Dulcitate	=	Acid and gas.
Glucose	=	Acid and gas.
Saccharose	=	Acid and gas.

*Progress of the Case.*—The rash was present on admission and disappeared fourteen days later, having faded slowly.

On the seventh day of treatment (eleventh day of illness) the notes on the case were: Rash almost purpuric, abdomen a little tympanitic, still complains of pain in back and neck; 25 cc. anti-typhoid serum injected under the skin.

The next day there were rhonchi in both lungs, and dulness over the right base; mental dulness was marked.

On the thirteenth day of illness retention of urine was noted, and on the fourteenth day the patient was delirious, but on the fifteenth day there was improvement which was maintained to recovery.

On the sixteenth day of illness a second injection of 25 cc. anti-typhoid serum was given.

*Remarks.*—This being our only case of its kind, we bring it forward with some diffidence as regards the bacillus, having in view the possibility that the organism was a contamination and not a bacillus from the blood. One cubic centimetre of a twenty-four-hour living broth culture of the bacillus, injected subcutaneously, produced no apparent effect on a guinea-pig. Moreover, the bacillus may not have been the cause of the symptoms. Nevertheless we have thought fit to publish the case as being interesting apart from the question of the micro-organism.

A fortnight after defervescence was complete, the Widal reaction for *B. typhosus* was positive 1 in 10, negative 1 in 20. This slight reaction may have been the result of the injections of anti-typhoid serum.

Since the patient's recovery his serum reaction with his own bacillus has declined in intensity, and three months after the onset of illness the record was complete 1 in 40, a trace 1 in 80.

## Reports.

### REPORT ON THE CONGRESS OF THE ROYAL SANITARY INSTITUTE HELD AT BRIGHTON, SEPTEMBER 5TH TO 10TH, 1910.

BY CAPTAIN C. H. STRATON.

*Royal Army Medical Corps.*

THE Congress was held in the Royal Pavilion, which provided ample accommodation for all meetings, with reception rooms, bureau, and post office. The exhibition was in The Dome in the same grounds.

Brighton is in many ways very advanced in its sanitation, its late medical officer of health, Dr. Newsholme, now Medical Officer to the Local Government Board, having led the way in many branches of preventive medicine and having been fully supported by the local council. The present medical officer, Dr. Duncan Forbes, has followed and extended the lines laid down by his predecessor.

The work of the Congress was divided into two main sections, those of (1) Sanitary Science and Preventive Medicine, and (2) Engineering and Architecture; while there were in addition eight conferences: (1) Municipal Representatives; (2) Port Sanitary Authorities; (3) Medical Officers of Health; (4) Engineers and Surveyors to Municipal Authorities; (5) Veterinary Inspectors; (6) Sanitary Inspectors; (7) Women on Hygiene, and (8) The Hygiene of Childhood.

There were many social functions which need not be touched on here. There were three lectures and addresses to the whole Congress: the inaugural address by Sir John Cockburn, the lecture to the Congress by Dr. Newsholme, and a popular lecture by Dr. Alexander Hill. The remainder of the work was done in the sections and conferences. These three lectures and the presidential addresses of the sections and conferences were the only ones that were read or delivered in full, all other papers being printed and distributed beforehand; the author was allowed five minutes to introduce his subject, the discussion followed, the paper being taken as read.

In the following pages a *précis* of the more important papers will be given, with any notable comments made on them in the course of the discussion; the papers will be published in due course in the Journal of the Institute.

Dr. Newsholme's lecture to the Congress was on the subject of "The National Importance of Child Mortality," and was of considerable interest. He drew attention to the remarkable fall in the birth-rate that has taken place in recent years, in practically all civilised countries except Germany, showing that this was the result of voluntary reduction, and had so far

extended that ere long the natural increase of population of this country would practically cease. This movement had served to concentrate our attention on infantile mortality, and had increased the importance of the reduction of such mortality to a minimum. It had been said, with regard to the prevention of infantile mortality, that all such work would, inasmuch as the mortality is highest among the lower strata of society, dilute our increase of population with a large number of the most inferior kind. Others would encourage child-bearing among the physically fit while forbidding unsuitable persons to propagate. Two points in connection with these criticisms needed discussion: (1) Is it certain that the population is being recruited in an increased proportion from the lower grades of society? (2) Is it certain that a lower infantile mortality will produce a survival of an increased proportion of physically inferior children?

The lecturer showed that at present the fertility rate was nearly as low in the large textile centres, such as Bradford and Halifax, as in the residential suburbs, such as Hampstead. He did not consider that poor physique and low mental possibilities were necessarily hereditary or dependent on social position so much as on environment during pregnancy and after birth; while he thought it probable that in the future the birth-rate would be artificially reduced among all strata of society.

It had been stated that although the infantile mortality was higher in some places than in others, yet this was only a slightly premature weeding out of the unfit, who would in any case succumb in the course of the first five years of life. By statistics Dr. Newsholme proved that, so far from this being the case, the truth lay in the contrary direction, and the mortality between the ages of 1 and 5 years varied directly, and not inversely, with that under the age of 1 year; in fact the conditions producing a high mortality among infants under 1 year continue to produce a high mortality up to the age of 20, and the superiority of "healthy" over "unhealthy" districts continues steadily from birth up to the age of 85.

From this it followed that districts having an excessive infant mortality were preventing the attainment of the highest possible standard of physique and health of the country, and the lecturer proceeded to point out the differences between the administrative counties in this respect, the colliery counties having the highest mortality and the agricultural the lowest. The mortality was very largely due to preventable disease, and was not due to dense massing of population on a small horizontal area, but rather to insanitary conditions. In colliery districts the enormous infantile mortality (Glamorgan 154, Durham 131 compared with Oxford 73 per 1,000 in 1908) was apparently due largely to the system of insanitary and overcrowded "tied" houses provided by the colliery owners, and to the highly paid miner being apparently satisfied with an inferior home.

In fine, healthy adult life depends very largely on healthy childhood; low infantile mortality does not produce national decadence, but high

infantile mortality is associated with national inferiority in health. Lowered infantile mortality has, of recent years, been associated with increased sobriety, but alcoholic habits are favoured by municipal dirt and insanitary conditions.

The subject of schools in relation to medical inspection of school children gave rise to two papers; these did not bring out any special points, but served to show the progress made by this new branch of preventive medicine. In connection with schools a paper by Dr. D. A. Carruthers, Education Medical Officer for Bucks, on "The Cleaning and Disinfection of Schools," gave rise to an interesting discussion. Dr. Carruthers advised the daily disinfection of schools by sprinkling the floors of rooms and passages with a solution equivalent to 1 in 20 carbolic acid before sweeping, and subsequently dusting desks and woodwork with a cloth damped in the same solution. To this process he attributed reduction in the number of cases of infectious disease and cessation of outbreaks. Dr. C. J. Thomas, in the discussion, entirely opposed this procedure, saying that disinfection of buildings and furniture was absolutely useless, and that disinfection of a school was impossible. The personal factor was far more important than the environment, and the range of infection was in all cases very small, probably not more than 2 feet. Drs. Collingridge, Barlow, Savage, Handford, Meredith Young and Professor Glaister also spoke. It seemed to be generally agreed that such measures as had been described were useful for cleansing, but were of no value for disinfection, and Professor Glaister was the only speaker who considered disinfection of school buildings to be necessary or of any value.

In the Conference of Sanitary Inspectors, Mr. Lewis, of Walsingham, contributed a paper on "Dry Excreta Closets for Rural Schools." He recommended a galvanised pail with a perforated bottom, to stand over a stoneware channel draining to a cesspool, the excreta remaining uncovered and being removed weekly; his objection to earth closets was that the pails require to be emptied almost every day, "as mischievous youngsters fill them with earth." He also described, but did not recommend, a "dry excreta bin system," wherein excreta fall on an inclined surface and are scraped off once a week with a hoe. This process is said to be recommended by the Board of Education.

In the second section Mr. W. H. Webb, of Wimbledon, dealt with designs for large public elementary schools for towns, and Mr. R. G. Kirby discussed designs for open-air schools, and Mr. E. Willis spoke on the conversion of schools to be used as special subject centres.

#### TUBERCULOSIS.

In one way and another a considerable amount of attention was given to tuberculosis. An interesting paper, contributed to Section 1 by Mr. G.

Morgan, dealt with the factors which prepare the soil of the lymph glands for tuberculous infection. He laid stress on the influence of acute infectious diseases in this connection, and pointed out that the date at which children should return to school after an attack of measles or whooping-cough must not be fixed only by the question of infectivity, but a reasonable period must be given to allow of recovery of general health, and a period of open-air convalescence should be permitted.

"The Municipal Control of Phthisis" was dealt with in a paper in Section 1, by Dr. W. Robertson, Medical Officer of Health for Leith, in which he described the methods adopted in his district. Early cases are taken into a sanatorium, where, at one time, old horse tramway cars were used as shelters. Advanced cases were visited in their own homes, or came under the Poor Law authorities. A general discussion ensued, which was contributed to by Drs. Willoughby, Corbin, Parkes, Kenwood, and Hope. The main difficulty appeared to be with the advanced, and consequently most dangerous cases, who could not be induced to take advantage of Poor Law accommodation, and who, in many cases, died of starvation in their own homes, which were, as a rule, quite unsuited for them. Visitation by health visitors was a valuable measure.

At the Conference of Municipal Representatives there were three papers on municipal sanatoria and treatment for phthisis. In Brighton there has been a voluntary notification system for this disease for the past ten years, and, excluding Poor Law cases, 54 per cent. of the cases notified during the past eight years have passed through the municipal sanatorium. The sanatorium is a block of the municipal hospital for infectious diseases, and is available for other purposes in periods of epidemics. There has been no instance of a consumptive patient, of whom there has been over 1,200, contracting any other disease. The cost of food, nursing, heating, and lighting for twenty-five patients is 25s. per patient per week. At Lewes the small-pox hospital is used in the summer for cases of phthisis at a total cost of 30s. a week per patient, of which 10s. 6d. a week is paid by the patient, the balance being obtained from subscriptions.

The Conference of Medical Officers of Health had before it an interesting paper on carriers of disease, by Dr. Davies, Medical Officer of Health for Bristol, which brought up to date a paper read by him at the Cardiff Congress in 1908. He said that although typhoid carriers had been most generally considered, yet probably all the infectious diseases, with the exception of small-pox, furnished similar phenomena, and the recognition of this had altered our views as to the relative importance of the personal and environmental factors in infection. Ample credit was given for the work done by the Army Medical Service in this direction, and it was urged that the system carried out at Naini Tal should be adopted by municipalities in this country. Dr. Stott, of East Sussex, described a sequence of fifty-eight cases in one district, extending from 1893 to 1910, due to a

cowman, infected by his master, who got the disease in the Worthing outbreak. From 1894 to 1899 this man was employed as a baker, and there were no cases; in 1899 he milked and there were four cases; after an interval he milked again in 1900, and four more cases occurred. In 1901 he went to a large farm where the milk was consumed on the premises, and whilst he was milking there four cases occurred in the house. In 1902 he returned to his former employer, and there were four more cases among the consumers of the milk. He stayed there till 1904, there being thirteen cases in all. Between 1904 and 1909 he acted as a labourer only, and during this period the only case of enteric fever in the district was a stroller who had apparently acquired the infection elsewhere. Within a month of his resumption of milking in 1909 further cases occurred, and it was not until July of this year that he was proved to be a carrier. He is now employed on road work.

Dr. Watts, of Aberdeen, had had a similar experience, and related the case of a woman who became infected in 1877 apparently from another carrier of long standing, and who between 1877 and 1908 had apparently infected seventy-one persons, including twenty-five farm servants connected with the dairy where she was employed; twenty-six of these cases occurred in one outbreak. Dr. Hay said that he had had success in the treatment of early carriers from the use of an ounce of magnesium sulphate in an ounce of water in the early morning, followed by 6 grains of calomel three or four hours later, all on an empty stomach. It was agreed that treatment must be undertaken early to be effective, and in the absence of legal powers voluntary co-operation was necessary. An instance of a grant of a small pension to a carrier to prevent her from engaging in the milk trade was cited.

In the Conference of Veterinary Inspectors Mr. Hunting, the President, opened a discussion on scarlet fever in relation to cow's milk. He entirely discredited the idea of any connection between eruptions on the udder of the cow and scarlet fever in man, and showed that in the London and Surrey cases of June, 1909—investigated by Hamer and Jones—there were equal possibilities of human infection. He also disputed the conclusions come to by Sir W. Power in the Hendon outbreak of 1885, and pointed out that scarlet fever had occurred within 600 yards of the cowsheds at this time. The disease affecting the cows in question was, he pointed out, diagnosed by the Veterinary Department of the Privy Council as cow-pox, and the infection was traced to the cows from Derby, which had been sold to four different cow-keepers, to each of whose farms the cows carried the latter disease, in one case infecting the hands of two milkers. No cases of scarlet fever occurred in connection with the other farms. He further pointed out that no attempts to infect cows from scarlet fever patients have been successful. In the 1909 cases he considered that the lesions noticed on the cows were the usual cracks and abrasions caused by the milkers' hands. In the discussion

Dr. L. Parkes agreed that the disease originated from human sources, and Mr. Roberts pointed out that, as eruptions and soreness of the udder were found on all milch cows, scarlet fever would be universal if there were any connection between the two conditions. Other speakers thought that the cow could not be freed entirely from suspicion whilst liable to suffer from a disease which had not been fully explained.

Mr. Morgan Hopkins, of Swansea, contributed a paper on the question of tuberculous milch cattle, advocating vigorous measures for the eradication of the disease from our shorthorn herds. Two papers on this subject were also read in the Conference of Veterinary Inspectors. The general feeling was that the question of compensation was so enormous that it could hardly be faced.

In the Conference of Sanitary Inspectors Mr. J. Weathercott, of Southwark, read a paper on adulteration of food. He stated that a very great improvement had resulted from the Act of 1860, and suggested legislative improvements. He mentioned that in most cases "special" milk for infants consisted of the ordinary milk without added colouring matter.

Mr. A. J. Martin, M.I.C.E., of the 2nd London Sanitary Company, Royal Army Medical Corps, Territorial Force, contributed a paper to Section 1 on sanitation in peace and war. Free use was made of lectures to the Institute by Sir A. Keogh and Lieutenant-Colonel Melville. The paper hardly lent itself to discussion, and, owing to the lateness of the hour, there was no opportunity for this.

In the Section of Architecture and Engineering a paper was read by Mr. Baldwin Latham on the influence of ground water on health. He pointed out that great epidemics had invariably broken out in periods of drought, and considered that this was due to pollution from the surface of a limited volume of ground water, the first water percolating after a dry period being the most foul and least diluted. He had paid some attention to the effect of exhalation from the ground as measured by the tensional difference between the temperature of the ground and that of the dew point. He showed a chart demonstrating a remarkable coincidence between the diarrhoeal death-rate and the tensional difference. He remarked on the especial dangers of soak-away cess-pits in the chalk, oolite, and new red sandstone formations, and said that he had in some cases found old deep wells used as cess-pits.

Mr. Shenton read a paper on the sterilisation of water and sewage effluents, laying stress on the importance of filtration before the addition of sterilising agents. It was stated that at Shrewsbury, where there was previous filtration by the Candy process, one part of available chlorine in two million was sufficient to obtain sterility—i.e., no *Bacillus coli* in 500 cc. The quantity required increased rapidly with the amount of organic matter, so that at Guildford, while 0.5 part per million was sufficient to reduce the *B. coli* content of the effluent of a fine third contact bed to

less than 0.2 per cc., 10.6 parts were required for that from the second contact bed, 20 for that from the first, 25 to 44 for the septic tank effluent, and 50 to 70 parts for the crude sewage.

Mr. C. Chambers Smith dealt with economy in sewage disposal, pointing out that undue expenditure in first cost and extravagance in working had occurred in many small installations. Ample records were necessary to check the working. The system of percolating filters was more satisfactory and economical than contact beds and the change to the former from the latter at Sutton, Surrey, had been fully justified. Double filtration was not as a rule necessary, though in some cases final filtration through sand was advisable. In comparison with the tables of cost of dealing with sewage given in the report of the Royal Commission, he stated that the cost of working at Sutton was, exclusive of loan charges, £2 16s. 6d. per million gallons, or a 1d. in the £1 rate, as compared with £4 7s. 2d. given for the same process in the Commission's report. In the discussion it was pointed out that much of the high cost of working previous installations was due to a striving after cheapness of construction.

Mr. Edgar Newton dealt with some dangers of sewage pollution of the sea. He held that the practice of sending untreated sewage into the sea was a danger to health from contamination of shell-fish, to fisheries from depletion of fish, and to sea-bathing from pollution of the water and foreshore. He said that sewage was often brought to the foreshore and not, as supposed, carried out to sea. Speakers in the discussion considered that very careful observations should be made of tides and currents before fixing on an outfall, but that if this was carefully placed, there was no more satisfactory method of dealing with sewage.

In the Conference of Engineers and Surveyors Mr. H. Thomson Lyon, late Chairman of the Highways Committee, City of Westminster, contributed a paper on the collection and disposal of house refuse, describing the process in Westminster, where there is a daily collection finishing at 10 a.m., chiefly carried out by direct labour. In some districts "flushing dustmen" are employed who flush roadways during the early part of the night and collect the refuse later; by increasing the number of flushers the roads are done earlier, and have time to dry, the dust collection is got over in good time, and a full "day's" work is provided for both classes of men. As to plant, motors are preferred to horses, and the tipping apparatus is confined to the wharf, and not attached to the wagon. For wagon-covers a plain, large canvas sheet is preferred to any other, and no complaint has ever been received that the dust blows about. He considered destructors expensive,

Dr. G. W. Eustace read a valuable paper on the effect of hygiene on the wage-earning capacity of the people. He instanced Port Sunlight and Bourneville, where good wages, good houses at low rents, and short hours of work, had benefited employer and worker equally, and had led

to improved health conditions of children. Dr. Kenwood, in the discussion, quoted cases in his experience in which improved conditions of ventilation in factories had led to improved commercial results. In this connection Mr. J. J. Robinson, editor of the *West Sussex Gazette*, urged that friendly societies, who are at present in great difficulties through sickness claims, should organise the study of hygiene, and so reduce the amounts expended on sick pay.

Mr. A. Saxon Snell contributed a paper entitled "Some Notes on Fever Hospitals," in which he recommended buildings constructed of a steel framing filled in with light concrete construction, formed of two thin slabs over the steel work, with an intervening air space, finished outside and in with hard plaster; the floors to be of concrete between steel joists and covered with an impervious composition. He would also reduce the number of separate blocks, providing a number of small wards separated by plate-glass walls fixed in steel frames, the glass being obscured to the height of 30 inches, the patients being easily kept under observation whilst different diseases could be treated in the same block.

Dr. Symons contributed a paper on ventilation of ordinary rooms. He said that windows should as a rule only be closed when the room is unoccupied, so that it feels warm on entering. He mentioned three useful devices for improvement of window ventilation. The first was the addition of a third sash to the ordinary double casement which would unite the other two when they were open and prevent the wind from blowing directly into the room. The second was a double fan window; the outer half hung from above, the inner fitted with weather guards and hung from below. The third device was a baffle-plate sash window, the baffle-plate being a piece of glass fitted into the outer stone frame of the window, occupying the whole width of the opening and 9 inches deep, fixed flush with, or not more than 2 inches below, the window head. The glass of the upper sash terminates 9 inches from the top of the sash.

Fleet-Surgeon Home, R.N., read a paper on the ventilation of ships, particularly merchant ships. After discussion of various theories of ventilation he briefly described three mechanisms for delivery and exhaustion of air—the Thermotank, adopted by the Cunard Company for the "*Mauretania*," which can be used either to deliver or exhaust air, the Sirocco fan for taking in and distributing air, and the Utley porthole ventilator, which consists of a passage over the top of the side light defended by cork floats against the waves.

A useful paper entitled "Mothercraft," was contributed by Dr. Sykes of St. Pancras, to the Conference of Municipal Representatives, in which he described the work done with a view to reduce the infantile mortality in his borough. The work is based largely on the Notification of Births Act of 1907, and is carried out under his supervision by women sanitary inspectors, and women health visitors, official, professional, voluntary, and philanthropic. A school has been established for mothers, young

wives, and prospective brides, providing instruction in food and feeding, food values and prices, simple cookery, cutting out and making baby clothes, preparation for the care of babies, and general housewifery and domestic health. Breast-feeding is the fundamental tenet of the school, and its lady medical officer is the judge as to the necessity for weaning, hand-feeding, use of special infants' milk, and so on. The work of the school was followed up by home demonstrations, and efforts were made to keep in touch with the children till they reached school age. Every care was taken to encourage the maintenance of a home and to avoid resort to institutional methods. The establishment was supported by voluntary contributions.

Dr. Boobhyer described the "Mothers' and Babies' Welcomes" established at Nottingham in 1908. The Corporation provided a house and the salaries of two nurses, the remaining expenses being paid from voluntary sources. Instruction of mothers and feeding of those that are necessitous were the main objects.

Other speakers preferred the establishment of milk depôts, particularly in factory districts, it being said that under industrial conditions many mothers were physically unable to nurse their infants.

Drs. Bushell and Hall read a paper urging the establishment of public bacteriologists on the same lines as public analysts, and a resolution in favour of this was passed by the conference of Medical Officers of Health.

Many other papers of less general interest were read at the different meetings, but those that have been mentioned above will give an idea of the wide scope of the Congress.

In connection with the Congress a number of excursions of sanitary and engineering interest were arranged. Of these two may be here mentioned. The first was to the outfall of the Brighton and Hove sewers near Rottingdean. The sewage is conveyed by gravitation in a 7-foot brick sewer to a spot on the coast about five miles east of Brighton where it is discharged into the sea through three 4-foot pipes protected by flap valves, and discharging throughout the ebb tide. There are storm overflows in the town which come into action after heavy rainfall. The sewage is said to be carried well out to sea in a south-westerly direction.

The other excursion was to the Brede waterworks for the supply of Hastings where there is an installation of Candy's high-pressure filters. The water here contains a very considerable quantity of iron which renders it, before treatment, unfit for drinking purposes. It is thoroughly aerated and passed through the polarite filters with excellent result, the iron and other impurities being removed and a drinking water of excellent quality produced.

The *Health Museum* did not contain many features that were new to those who had visited the Ideal Home and similar exhibitions. Among the more notable exhibits were Lovibond's Tintometer as applied for the detection of adulteration of milk by charting its colour when layers of

different thicknesses are examined. It may be mentioned that this instrument is invaluable for all colorimetric analytical processes.

The Interoven Stove Company showed a combined sitting-room stove and cooking range, fitted with a large oven and hot plate with, or without, a high-pressure boiler. It might be useful for warrant officers' and other quarters, as it can be instantly converted from a cooking range into what is apparently an ornamental sitting-room grate.

Messrs. H. Lowry, Ltd., of Belfast, exhibited "The Cobra Drain Cleanser" which consists of a flexible steel spring tube fitted with toothed jaws actuated by a wire passing through it to the handle, similar to a "Bowden" bicycle brake. The apparatus can be passed through any trap or round any bends, and will remove obstructions without breaking open the pipes. There are other forms of head and extra lengths of tubing which can be attached. With 6 feet of tubing and accessories the price is 25s.

## Lecture.

### INTER-COMMUNICATION AND ORDERS.<sup>1</sup>

BY CAPTAIN AND BREVET-MAJOR W. H. ANDERSON, p.s.c.

*1st Cheshire Regiment.*

#### SYLLABUS.

*The system of inter-communication and of writing field messages, reports, &c., in order that medical officers may be capable of communicating with other branches of the Army in the field when required. The principles regulating the communication of orders, the different kinds of orders issued, and the points that should be attended to in writing them.*

The first subject of the lecture I have been asked to give to-day is—

(1) *The System of Inter-communication of the Army in the Field*, and to make that clear I have drawn up a rough diagram showing the means at the disposal of the Commanders of a Division and of the Cavalry Division for transmitting orders, messages, and reports forwards and backwards. These means comprise Telegraph, Wireless, Telephone, Motor Cars, Bicycles, Signalling, Despatch Riders or Mounted Orderlies, and Foot Orderlies, and efforts are now being made to organise a corps of Motor Cyclists. The details of means of communication available with each unit will be found in War Establishments.

At present the Signallers, Bicyclists, and Telephonists are regimental and distinct from the Telegraph Companies, which are R.E.; but the



Medical Officers may be capable of communicating with other branches of the Service in the Field when required.

Having explained the existing means of communication, we wish to see how to use them. The official regulations as regards messages will be found in Field Service Regulations, Part I., p. 29.

First of all, then, always bear in mind that the message or report may have to be read by the General or Officer you send it to, or by the Signaller or Telegraphist, by the light of a guttering candle in a tent or bivouac, and write with that idea. Also the Signal *personnel* is very fully employed on Service, and nothing should be sent by wire, orderly, or signal, that could go just as well by post. All messages should be in writing; verbal messages often go wrong, or are twisted round. For instance: "Has anyone in E. Coy. anything to cut wire" may become "E. Coy. is to retire," as it actually did on one occasion in South Africa. Then the man who sends the messages—the Signaller, Telephonist or Telegraphist—is *not* the man to write it out. Use Army Book 153 and Envelope, and take carbon copy for retention. Or if sending a signal message write on Army Form C. 2121.

*Specimen.*

No. 32. *Date*, 2-5-10. *Time*, 9.30 a.m. *Place*, BELFAST.

*To* O.C. 1/ Cheshire Regt. *Place*, HOLYWOOD.

Your 22 of 1-5-10. The 5 men therein mentioned leave here by march route 10.30 a.m. to-day—arrive HOLYWOOD 12 noon.

From M.O. i/c 1/ Cheshire Regt.

If sending a message to several people state at the end to whom addressed and to whom repeated, so that every person who receives the information knows who else has got it. For instance, ..... addressed A.M.O. 1st Div. repeated M.O. i/c Cheshire Regiment, M.O. i/c Lanc. Fus., and M.O. i/c Durham L.I.

In signal messages it is always best to write numbers in words and block letter the word "*Not*." The word "*Stop*" should be used to make the message clear where stops are required in a telegraph, telephone, or signal message. For instance: "Have you reported your arrival *stop* as far as Chester the road is suitable for ambulance wagons." Without the "*stop*" a different reading might be given to this message.

(3) *Reports*.—As regards reports (for which see Field Service Regulations, Part I., p. 30)—the above remarks apply equally, but in addition it is important to remember that the main thing is that the information should be relevant and accurate, and in time to be of use, rather than long and elaborate. Always differentiate between what is certain and what is hearsay, in the latter case giving source of information and the amount of credibility to be attached to it.

Negative information may often be of value—for instance, it may be

of the greatest importance to know there is *not* a County Hospital in a big county town you may arrive in. One is often apt to report on what you *have* found in a place, &c., and to neglect what you have *not* discovered. Then a rough sketch will often be the best means of rendering a report, and if such is sent in, try to give all the information on the sketch and avoid a report in writing as well. This latter means turning from the sketch to the report and *vice versa*, and wastes time.

(4) The next subject is: "*The principles regulating the communication of orders in the field: the different kinds of orders issued.*" If you refer to Field Service Regulations, Part I., p. 22, you will see that Orders in the Field are divided into—

- (i.) Standing.
- (ii.) Operation.
- (iii.) Routine.
- (iv.) Messages.

Orders of the Day; and special instructions for detached forces, are also used when required. Each of the above is kept separate, and numbered separately and headed as above. Each copy also should have a consecutive number, the object being to keep a check on the units, &c., to whom copies are issued in case one goes astray. Each order is divided into numbered paragraphs, and a short subject reference written in the margin to facilitate reference. No reasons or explanations are, as a rule, required in an order. First, then:

(i.) *Standing Orders* are generally issued at the beginning of the campaign to prevent frequent repetition afterwards of the same order, and to adapt regulations to local conditions. They comprise matters of discipline, routine, sanitary precautions, &c., and are revised and added to from time to time. They are issued by the A.G. staff, after consultation with the Q.M.G. Staff and heads of Administrative Services. Suitable headings for matter to go in Standing Orders will be found in the Field Service Pocket Book, p. 87.

(ii.) *Operation Orders* deal with all operations in the field, and are issued by the General Staff. They include such information as to administrative arrangements, supply, transport, ammunition, medical arrangements, and other services of maintenance as *it is necessary for the troops to know*. These are obtained by the General Staff from the heads of departments concerned before the issue of the orders. Detailed orders on the above services, which it is *not* necessary for the troops to know, are issued direct by the heads to those concerned.

Operation Orders are intended to tell the recipient just what he is required to know for the furtherance of the G.O.C.'s plans and *no more*—they tell him what he has to do, but *not* how he is to do it. It must always be remembered that the man on the spot is the best able to judge the means of carrying out the wishes of his superior at a distance.

To tie down a subordinate with definite orders, followed by "await further orders," is dangerous and kills all initiative.

These orders must be arranged in logical sequence, though the exact form of the Order is not all-important. They must always be headed as on the example I have drawn up, and the reference to the map used in describing places must always be given. Example:—

*Example.*

*Copy No. 2.*

# OPERATION ORDER No. 21

BY

MAJOR-GENERAL X., COMMANDING 1ST DIVISION.

King's Arms, ALDERSHOT,

10-5-10.

Ref.  $\frac{1}{2}$  in. Ordnance Map, Sheet No. 22.

1. General situation .....
2. G.O.C.'s intentions .....
3. Orders for fighting troops .....
4. Orders for supply .....
5. Orders for transport .....
6. Orders for ammunition .....
7. Medical arrangements .....
8. Veterinary arrangements .....
9. Position of Commander and  
where reports are to be sent .....

(sd.) A.B., Colonel,

General Staff, 1st Division.

Issued at 9.30 p.m.

By telegraph to G.O.C. 1st Inf. Brigade.

By Mounted Orderly to G.O.C. 2nd Inf. Brigade.

Personally to representatives of G.O.C. 3rd Inf. Brigade,  
G.O.C., R.A. (&c.).

For Detached Forces, General Instructions, *not* Orders, are issued, giving confidentially the general situation and the objects of the Commander.

(iii.) *Routine Orders.*—These are issued, as in peace, by the A.G. and Q.M.G. Staff and by subordinate commanders. Parts of them are afterwards included in the Standing Orders as required.

(iv.) *Messages* have already been dealt with.

(5) We now come to the *general points that should be attended to in writing orders, reports, and messages*. Some of these have been already alluded to in the remarks on messages, but there are others which apply to all forms of instructions on the field.

(i.) They should be always in writing where possible, or if verbal subsequently confirmed in writing.

(ii.) As concise as possible: literary style is not required: simple

language, and great exactness as to *time* and *place*. For instance, avoid "dawn," "dusk," "if possible," "near," "right," "left" (except when speaking of river banks): always "12 noon" or "12 midnight," and "night of 13/14 Sept." or "31 Aug./1 Sept." Places: names *not*: and cipher always printed in block letters, and cipher in groups of five letters.

(iii.) Care is required in using abbreviations that confusion is not caused. For instance:—"1 Batt. 2 Bde." might mean "1st Battery 2nd Field Artillery Brigade" or "1st Battalion 2nd Infantry Brigade." Army List abbreviations for units should be used.

(iv.) In referring to part of a unit—say the whole less the bit: for instance *Not* 6 Companies, 1 Cheshire Regt. But 1st Cheshire Regt., less 2 Companies, or 2nd Field Ambulance, less 1 Section.

(v.) In referring to maps, use true bearings and the points of the compass, and be careful if there are two places of the same name to distinguish them. For instance, STONELY Village  $\frac{1}{2}$ -inch N.W. of B in BELFAST or Bridge just N. of 2nd S in STONEFAST: the letter referred to being underlined.

(6) When troops are referred to as reaching or leaving certain spots the *head* of the main body is always meant unless definitely said otherwise.

(7) Orders to be signed with name, rank, *and* appointment.

(8) And most important of all: after writing an order, report, or message, always read it through and make sure it is clear; if possible, get someone else to read it and tell you what he would do on receipt of it. You must always legislate for the inevitable fool, through whose hand your orders or message may pass, and who will read them wrongly if he possibly can.

(9) Keep a copy by means of carbon paper.

## Reviews.

THE CASE AGAINST CHRISTIAN SCIENCE. By Stephen Paget, F.R.C.S., Cassell and Co. Price 6d.

These short papers, read at the Church Congress, Swansea, and at the Annual Meeting of the Congregational Union, Sheffield, follow the lines of Mr. Paget's book, "The Faith and Works of Christian Science." He asks how it is that Christian Science has taken hold of such a vast multitude of gentle, educated, well-disposed Englishmen and Englishwomen. He gives three reasons, which seem to him to lie at the very foundation of its prosperity.

In the first place the use of big philosophical words and of grand vague phrases attracts attention. "All is mind," sounds well and plays up to our natural desire to think on a large scale.

In the next place Christian Science is able, in a moment, to drop her philosophical talk, to use the very simplest and most familiar phrases of

religion ; she goes direct from her random talk about mind and matter to the homely language that we learned when we were boys and girls. She is always telling of the presence of God and of trusting in God alone. She has discovered again the gift of quietism, the happy sense that—

"God's in His Heaven,  
All's well with the world."

She has recalled to many the fact, older than Christianity, that the kingdom of God is within us.

But, of course, her true strength, her ultimate secret, is neither in her sham philosophy nor in her devotions, but in her promise to heal all manner of diseases.

Mr. Paget quotes Mrs. Eddy as saying : " I have well-authenticated records of the cure of dislocated joints and spinal vertebræ. Shortened limbs have been elongated and carious bones have been restored to healthy conditions. I have restored what is called the lost substance of lungs. I healed malignant tubercular diphtheria. I healed a cancer that had so eaten the flesh of the neck as to expose the jugular vein." In spite of all this stuff he gives Christian Science the credit for healing many such cases as are amenable to hypnotism or suggestion ; and not merely those ailments which we call neurotic, but alcoholism and even the cocaine and morphine habits. But he adds that he has not yet found any clear evidence that she has once in these thirty years, all over the world, healed a single case that might not have got well of itself or under treatment by " suggestion." On the contrary, thousands have been killed by sheer deliberate ignorance, and by wilful refusal to lift a finger for them.

J. T. C.

PROTOZOLOGY. By G. N. Calkins. London : Baillière, Tindall and Cox, 1910. Pp. ix. and 349.

A knowledge of protozoa is becoming more and more essential to pathologists. The standard works of reference are Doflein's " Der Protozoon als Parasiten und Krankheitserreger," and V. Prowazek's " Einführung in die Physiologie der Einzelligen (Protozoen)." To the English reader, however, the volume before us offers a useful substitute though the range covered is not so great. The author defines a protozoon as a primitive animal organism, usually consisting of a single cell, whose protoplasm becomes distributed among many free living cells. These reproduce their kind by division, by budding, or by spore formation, the race formed passing through different changes, and the protoplasm through various stages of vitality, collectively known as the life-cycle. Some protozoa attain a large size. *Parospora gigantea*, a parasite of the intestine of the lobster, measures 16 mm. in length. Drinking waters may be coloured red by *Euglena sanguinea*, yellow by *Dinobryon*. They may be rendered fœtid by *Uroglena*, or *Synura uvella*. The sea is sometimes reddened by *Peridinium*, or made of orange hue by *Noctiluca*. He concludes the chapter on the " Physiological Activities of the Protozoa " with the statement that they are complete living organisms in which no function found in the higher animals is lacking. He discusses the " Protoplasmic age of Protozoa," and decides that the " somatic vitality, whether in protozoon or man is a ' peau de chagrin ' which constantly diminishes

with use, till nought is left." A chapter is headed "Parasitism." He says that it is not a too sweeping generalization to state that every living thing, large enough to contain another living thing, is subject to invasion by parasites. Parasites often infect the nucleus of amoeba, paramaecium, and vorticella.

The author is of opinion that the cancer cell is a complete organism in itself, which stimulates in many ways the parasitic protozoon. He compares it with the amoeboid flagellate, *Plasmodiophora brassicae*, which attacks the roots of cabbages and turnips, causing large infective tumours. The spirochaetes found in mouse cancer by Gaylord are of no pathological importance; they are absent in human malignant growths.

While referring to a flagellated stage of *Plasmodium vivax* he remarks, parenthetically, "if such a stage exists, which is extremely doubtful." Nevertheless, he subsequently describes it and represents such forms on two plates.

We regret to see that Krzysztalowicz and Siedlecki's misleading and erroneous figures of forms alleged to be assumed by the *Treponema pallidum* have been reproduced. These observers have admitted their errors in a recent paper. Calkin's statement that the *T. pallidum* is highly variable in form is inaccurate. When examined in the living state under dark-ground illumination it is remarkably constant in its appearance.

It is stated incorrectly that in certain stages trypanosomes are ultra-microscopic, and that they can pass through Berkefeld filters. Bruce and Bateman showed that *T. lewisi*, *T. brucei*, and *T. evansi*, which had developed in the animal body, were unable to penetrate a Berkefeld candle which had been tested with the *Micrococcus melitensis*. Moreover, cultures of *T. lewisi* were also retained.

The presence of Negri bodies in the cells of the brain and spinal cord of rabid animals is of great diagnostic value and enables us to give an immediate expression of opinion, without the delay of animal inoculation. The author does not hesitate to describe the stages of reproduction of *Neurorhynchus hydrophobiae* and *Cytorhynchus variolae*, though he admits that the virus of both rabies and small-pox can pass through a porcelain filter. He administers a sharp reproof to the medical profession for their want of faith on this and other points. The study of protozoa is almost entirely morphological, hence we find a tendency for protozoologists to read life processes into microscopical appearances of stained preparations.

Considerable doubt must be thrown on Craig's description of conjugation of two malarial schizonts in the human red blood corpuscle. In the first place the evidence of sexual differences in schizonts is not convincing, and secondly the union of two cells without subsequent fertilization and reproduction is a common event among protozoa. It has been noted in amoeba, arcella, difflugia, and others.

Mention is made of the invasion of the human skin by a sporozoon, *Coccidioides immitis*, which may pass to the viscera and cause death.

Theiler has ascertained that a new species of haemamoeba, *Anaplasma marginale* is the cause of gall sickness in cattle, which he had attributed in error to *Trypanosoma theileri*. The multiplication forms described by Minobin and Grey in the forepart of the digestive tract of *Glossina palpalis* are those of *Trypanosoma greyi* and not of *T. gambiense*; the text requires correction on these two points.

Since no less than one-third of the book deals with protozoa, the volume will be welcomed by the medical world. Should more detailed knowledge be sought for, the bibliography, which fills twenty-three pages, will guide the inquirer.

C. B.

**SPRAINS AND ALLIED INJURIES OF JOINTS.** By R. H. Anglin Whitelocke, M.D., M.C.Edin., F.R.C.S.Eng. London: Henry Frowde, Hodder and Stoughton. Second Edition, 1910. Pp. vix. and 280. Price 7s. 6d. net.

This book will be found a very useful addition to the literature on the subject; the author has in the present edition brought the subject thoroughly up to date, and has thrown new light on many hitherto troublesome conditions, thereby rendering them capable of treatment on a more rational and scientific basis.

On page 43 the fact is emphasised that muscle wasting commences immediately after an injury sufficient to enforce, more or less, the disuse of a joint, and to combat this the author asserts that properly controlled voluntary movement is of the greatest value.

On page 63 is a radiogram of a case of myositis ossificans of the thigh mistaken for sarcoma: a point indeed very worthy of consideration especially when the treatment of the affections has to be decided.

On page 208 is found a useful note on the importance of X-ray examination in cases of chronic sacro-lumbar pain, in many of which fracture of a transverse process has been revealed.

The book closes with an account of the special methods of treatment of sprains in which is included the more recent procedures, such as radiant heat, Bier's hyperæmic treatment, mechanotherapy, injection of fibrolysin, and kataphoresis.

C. B. L.

**DISEASES OF THE SKIN.** By J. N. Hyde. London: Baillière, Tindall and Cox, 1910. Eighth Edition. Pp. xxiv. and 1226. Price 25s. net.

This book is rather too large to form part of a medical officer's library, but is a first-class work of reference. It is very well got up, printed on good paper, and is illustrated by numerous photographs, which are most excellent. A special feature of the book is the space (72 pages) devoted to diseases of the Tropics exhibiting cutaneous lesions. The section on syphilis is good, but we cannot agree that "the more profuse and general the earlier rashes of syphilis; the more favourable is the prognosis." A useful hint mentioned, is to give a hot bath to a doubtful case of syphilis, as it will often bring out a rash. The pigmentary syphilide is stated to commence as brown pigmented spots, which gradually fade and become white, the surrounding skin meanwhile becoming pigmented. This latter condition is what one usually sees. The term "tubercular syphilide" is used in place of "nodular syphilide," which is a better designation as avoiding the suggestion of any connection with tuberculosis. Cheiropompholyx is classed as a variety of pemphigus; most of our authorities now regard it as a clinical variety of eczema. In the articles on pemphigus and dermatitis herpetiformis there is no mention of the fact that the Vienna school regard them as the same disease. A good account is given of the new treatment of vascular nævi with solid carbon dioxide. In the treatment of scabies balsam of Peru is referred to, but no particulars are

given of how the treatment should be carried out, and  $\beta$  naphthol is not mentioned. The theory of the neurotic causation of alopecia areata is supported more than the parasitic, which is in agreement with most London teachers. In discussing the treatment of ringworm of the scalp enough emphasis is not laid on the fact that the remedy must produce sufficient inflammation of the patch to cause the hairs to fall out, and that any stumps which do not fall out should be needled with croton oil. Treatment by X-rays is recommended, but no information is given as to how the dose is measured. There is no mention of the fact that it is best to use only one exposure as the effects of X-rays are cumulative, nor is it stated that X-rays are dangerous if iodine has been applied.

A. D. J.

## Current Literature.

**Discussion on "606," or "Hata." Section for Dermatology and Syphilis** (82. *Versammlung deutscher Naturforscher und Arzte*, September, 1910).—Professor Ehrlich opened the discussion and called attention to the following three properties which this remedy has been found to possess:—

(1) When the dose is sufficiently large all spirochaetes disappear in twenty-four to forty-eight hours; when this does not take place, the dose has been insufficient.

(2) The administration of this remedy gives rise to the production of anti-bodies. The presence of these is deduced from the fact that in the case of a syphilitic mother treated with "606" and continuing to suckle her child, the symptoms of the disease disappeared in both mother and child; the quantity of "606" which reached the child through the mother's milk was infinitesimal, and the child's recovery can only be explained on the supposition that the mother's milk contained anti-bodies.

(3) *Serum Reaction*.—In some cases a negative Wassermann reaction may be present, but after an injection of "606" the reaction becomes positive. The explanation is probably that in these cases the number of spirochaetes is too small to produce the positive reaction; the injection rapidly destroys all the spirochaetes and lets their substance loose in the circulation, thus producing the positive serum reaction. Further observations will be required as to the duration of the negative reaction which is usually found after an injection of "606."

Another curious phenomenon is the rapid improvement which may follow an injection of "606." Thus, a patient who has been unable to swallow solid food for months, may do so in comfort a few hours after the injection. This and similar extraordinarily rapid improvements may be due to a combination of the "606" with the toxins of syphilis. This is, however, only a theoretical explanation. The opposite condition may also take place; that is to say, an injection may be followed by a great increase in the symptoms. In these cases the dose was probably

insufficient to kill the spirochaetes and merely irritated them, thus producing an increased secretion of toxins.

As regards its poisonous properties, Professor Ehrlich points out that he has always insisted on the possible dangers attendant on the administration of large doses of arsenic. Up to the present he has received reports on 10,000 to 12,000 injections, and these show that, in general, there is no special risk attached to the use of this remedy. Of the fatal cases reported, some have occurred in extremely debilitated cases, apparently as the result of shock; in others, the nervous system was profoundly affected. In spite of these, it is worth while giving the remedy a trial, even in desperate cases, just as the surgeon will often operate to give the patient a last chance. The only really unsuitable cases are those in which the nervous system has undergone severe organic degeneration, or those in which the heart and large blood-vessels are extensively diseased.

As to the administration, as a general rule an intravenous injection of 0.4 to 0.5 gramme is well tolerated and acts rapidly; next to this comes the alkaline solution tried by Alt and Iversen, but which has the objection of being somewhat painful. The neutral emulsion of Michaelis and Wechselmann is much less painful. In future the plan introduced by Iversen of giving an intravenous and a subcutaneous injection will probably be largely employed. In this plan 0.4 or 0.5 gramme is injected intravenously and a similar dose intramuscularly or subcutaneously, the idea being to obtain a rapid effect by the intravenous injection and a slower but more prolonged effect from the intramuscular injection.

*Dosage.*—The question of dosage is of the greatest importance, but it is too early to fix it definitely as yet. In cases accompanied by severe nervous symptoms the dose should be small to start with—not more than 0.4 gramme. In healthy individuals, on the other hand, we should give the largest possible dose—0.8 to 1 gramme, and possibly even more.

"Hata," or "606," also acts beneficially in other diseases, of which framboesia is one of the most important. It also exerts a powerful influence on spirochætal diseases, especially spirillosis of fowls, and also on relapsing fever. In tertian malaria its value has also been proved, but in the quartan and the æstivo-autumnal forms it has little or no effect. A severe case of small-pox treated with "606" made a remarkable recovery, apparently due to the remedy.

Many other leading syphilologists took part in the discussion and related their special experiences in the use of the drug.

C. E. P.

**Studies in Relation to Malaria.** By Samuel T. Darling, M.D. Isthmian Canal Commission.

This little pamphlet contains a summary of the research work carried out in the laboratory of the Board of Health, Department of Sanitation. Some portions of this work, which should prove of great assistance to officers engaged in the investigation of malaria in our foreign stations, are reproduced below.

*Collection of Larvæ.*—Sanitary inspectors of the various districts were asked to send bottles containing larvæ and pupæ to the laboratory daily; in addition, special excursions were made to the breeding grounds. When received at the laboratory, predaceous larvæ were first removed; the

Anopheles larvæ were then transferred to glass breeding tanks, containing algæ and organic *débris*. These tanks were placed in front of a window having an eastern exposure, so that they got direct sunlight for a few hours in the morning. The water in the breeding tanks was kept fresh and free from fouling by passing a jet of air through it with a Pacquelin cautery bulb having a heavy glass perforated tip. This proved to be a very important addition to the technique of breeding out larvæ. For shade and shelter a few lemna plants were placed in the tank. The temperature of the water in the tanks ranged between 72° and 84° F.

*Breeding Out; Methods of Feeding.*—Pupæ were culled in the morning and evening and placed in breeding-out tubes plugged with cotton-wool. Each morning the newly emerged mosquitoes were transferred to biting jars. After many trials, lantern chimneys were selected as most suitable for this purpose. Both ends were covered with crinoline gauze fastened with string or a strong rubber band. Inside the jar was placed a circular ring platform of stiff paper, which many of the mosquitoes used as a resting place. About twenty mosquitoes were placed in a jar over a small dish containing water in a Petri dish-cover, with a raisin or a piece of date for food. The jars were then placed in a dimly lighted place, protected from ants by kerosine cups. Adult mosquitoes may be kept alive in this way for several days, but if fed daily they will not bite. Anophelines do much better if they have one or two blood meals before being fed with dates or raisins. When fed on bananas the midgut is found to contain large quantities of bacteria and acid-forming yeasts; this condition appears to prevent the development of zygotes.

*Biting Experiments.*—The most successful plan was to place the patient's bed in the dark, tap the tube once or twice, and aim it at the light some distance away; the patient's arm was then carefully interposed and applied to the gauze covering the end of the tube. When biting experiments were carried out in the afternoon a thick towel was placed over the jar.

*Estimation of Gametes.*—The average weight of a twenty-four-hour-old mosquito was 0.0008 gramme, and after biting it was 0.0016 gramme, the average weight of blood ingested being nearly 0.001 gramme, which is calculated to be 0.000761 c.cm. The number of gametes, as also of leucocytes, was determined by making a blood film at the time of biting. In one case twenty-two gametes were found for every 100 leucocytes and 6,500 leucocytes per c.mm.; this would equal 1,088 gametes ingested in the 0.761 c.mm. of blood. If the male and female gametes were equal in number, there should have been 1,632 zygotes in the mosquito's mid-gut after three feedings; but as a matter of fact there were only fifty, showing a loss of 97 per cent. Observations *in vitro* show that fully 50 per cent. of gametes are phagocyted by polymorphonuclear leucocytes.

*Care of Mosquitoes after Biting.*—If it is desired to ascertain the rate of development of zygotes, mosquitoes should be fed on dates after biting and kept with very little water. They must be protected from ants. If it is desired to keep the specimen for identification it is advisable to kill the insect with cyanide, as this causes the mosquito to spread its wings.

*Malarial Parasite in the Mosquito.*—The earliest form of the æstivo-autumnal zygote was detected in the wall of the gut after the expulsion of the blood meal, or after two and a half days. Satisfactory dissec-

tions and examinations cannot be made until the blood meal has been expelled; after several trials it was found that sixty hours after feeding was the earliest time at which a search should be made for zygotes.

In experiment No. 204 a specimen of *A. tarsimaculata* was killed sixty-five hours after a single feeding on a patient whose blood contained ten crescents per 100 leucocytes. Upon examination there were about fifty zygotes in the midgut. They were slightly oval in outline, with closely clumped quiescent pigment, and very little cytoplasm showing beyond the pigment, the diameter being about  $5\ \mu$ . The zygotes become larger each day, though they do not always appear to grow at equal pace.

In experiment No. 33 a specimen of *A. albimanus* contained twelve to fifteen æstivo-autumnal zygotes, three and three-fourths to four and three-fourths days old, 12 by  $13.5\ \mu$  in size, mostly oval in outline.

The capsule of the zygote ruptures about the eleventh day, the sporozoites making their way to the salivary glands, and leaving the collapsed, wrinkled, disc-shaped envelopes behind in the outer layer of the midgut wall. The mechanism of the passage of the sporozoites into the salivary glands is not known, but these glands are more or less filled with sporozoites after the eleventh day.

The tertian zygote develops more rapidly than the æstivo-autumnal.

#### RESULTS OF FEEDING MOSQUITOES ON INFECTED PATIENTS.

Species	Number	Infected	Per cent. infected
<i>A. malefactor</i> .. ..	17 .. ..	0 .. ..	0.0
<i>A. pseudopunctipennis</i> .. ..	31 .. ..	4 .. ..	12.9
<i>A. albimanus</i> .. ..	48 + 2 .. ..	34 + 2 .. ..	70.2
<i>A. argyrotarsis</i> <sup>1</sup> .. ..	4 .. ..	0 .. ..	0.0
<i>A. tarsimaculata</i> .. ..	5 .. ..	3 .. ..	60.0

It is concluded from this series of experiments that *A. albimanus*, the common white hind-footed mosquito, an extremely hardy, rapidly developing, adaptable mosquito, is the transmitter of æstivo-autumnal and of the tertian malarial fever in the Canal Zone at this time. Specimens of this species infected with tertian parasites became infective between nine and eleven days after the first feeding. When infected by æstivo-autumnal parasites, sporozoites appeared in the salivary glands as early as the eleventh day in some of the mosquitoes.

*Limits of Infectiousness of Man.*—During the progress of the experiments it was noticed that patients were discharged after their temperature had become normal, and when their peripheral blood occasionally contained more than a sufficient number of gametes to infect susceptible mosquitoes. In order that a recommendation might be made for the continued treatment of these persons, it was necessary to determine, if possible, the limits of infectiousness of such individuals.

Several experiments were carried out, in which *A. albimanus* bit patients whose gametes per leucocyte had been determined. These mosquitoes were given but one blood-feeding, and fed subsequently on dates and raisins and then dissected. The limits were determined as being near one gamete for every 500 leucocytes, or 12 gametes per 1 c.mm. But it must be understood that several factors are concerned in infections, such as the number and phagocytic power of the leucocytes; immunity

of mosquitoes, racial and individual; probable reaction of gut contents, as acid bacterial products or those from yeasts may be inimical to the gametes; the proportion of male to female gametes plays some part. In experiments 20 and 28 the patient's blood was rich in crescents which flagellated *in vitro*, and in the mosquito's stomach, yet mosquitoes never could be infected from the patients.

Persons with more than 12 gametes per 1 c.mm. must be regarded as gamete carriers; and, of course, should not be discharged from hospital, nor should treatment be discontinued until gametes have been reduced well below the limits of infectiousness. This destruction and prevention of the development of the sexual forms of the parasite in man is a matter generally overlooked; but it is of the greatest importance in delimiting malaria, and may be accomplished by appropriate quinine treatment of all gamete carriers to destroy latent malaria, and by periodical blood examination of labourers and others in quarters where there is a high malarial rate. In order to carry out appropriate treatment, 30 grains of quinine sulphate in solution daily is an efficient dosage for the purpose required.

#### NOTES ON THE BIONOMICS OF SOME OF THE ANOPHELINES PRESENT.

The period of incubation of the ova of *Anopheles albimanus*, *A. pseudopunctipennis*, and *A. malefactor* was estimated as about thirty-six hours under the laboratory conditions—i.e., a temperature of the air and water was between 78° and 82° F., the tank had an eastern window exposure with direct sunlight for three or four hours in the morning, and diffused sunlight the remainder of the day.

Ova of *A. albimanus*, still creamy-white in colour, were placed in a breeding tank exposed to the morning sun on December 3rd; temperature of the water, 78° to 82° F. Of these ova, five became larvæ and pupated December 14th and 15th. These pupæ became imagines during the night of 16th and 17th, making the period from ovum to imago about thirteen and a half days. Under these conditions they did not get as much sunlight as they would have received outside. Sunlight and the abundance of algæ undoubtedly play a great part in the duration of the period of incubation. It should be added that these five mosquitoes, two males and three females, were placed in a biting jar the morning they emerged (December 17th), and that same evening each one of the three females bit and drew blood at once when applied to the arm of the patient. In this instance, mosquitoes bit when not more than twenty-four hours old.

*Hardiness of A. albimanus.*—This mosquito is well fitted for the purpose of transmitting malarial fever. It is the commonest species here at the present time, outnumbering all others, excepting possibly *A. pseudopunctipennis*, which latter species is not very hospitable to the malarial parasite.

It breeds in a great variety of locations, besides the customary pools and margins of streams, collections of rain-water; during the dry season it may be found in the stinking water of sewage streams, brackish marshes, running streams, meadows, muddy pools, old crab-holes, and in shady pools and river margins. It outlives the other species in confinement.

When virgin anophelines have been given one or two blood meals, two or three days after emerging, they have lived as long as sixteen days.

A specimen of *A. malefactor* was badly wet and sprawled; upon placing her upon a piece of filter paper and touching or approaching her proboscis the latter vibrated visibly, and emitted the characteristic high-pitched note; the wings were at rest, being stuck to the paper. This was verified again and again. Later I picked up a slightly water-sprawled infected mosquito for dissection and held it over a few drops of chloroform; both wings were seen to vibrate rapidly, as in flight, but noiselessly; while holding the mosquito by the last abdominal segment and touching one wing at its tip the opposite wing would immediately stop vibrating. Upon releasing the wing, both would vibrate noiselessly, as before. The noise of the mosquito is due, then, to the vibration of its proboscis, and the wing vibration is dependently and automatically co-ordinated.

*Blood-feeding necessary for Anophelines.*—A blood meal seems to be necessary for the development of the ova of anophelines. In experiment No. 40, to determine this point, male and females, *A. albimanus* and *A. pseudopunctipennis* were placed in a breeding-jar and fed on vegetable food and water daily, but they received no blood meals. Upon dissection of females as they died, none showed any development of the ovaries.

*Experiments with Larvicides.*—A number of experiments were carried out for the purpose of obtaining a cheap and efficient preparation for destroying mosquito larvæ. Crude petroleum oil was frequently too viscid to have a spreading power of the highest efficiency. When mixed with crude carbolic acid, however, its spreading powers were increased. From laboratory tests it was determined that crude petroleum for surface use on pools should not be heavier than 38° Baumé (American standard).

Much of the crude carbolic acid supplied had been found upon analysis to consist chiefly of inert neutral oils with a small proportion, 5 to 10 per cent., of tar acids. It was found that crude carbolic acid, having a specific gravity not greater than 0.96 or 0.97 and containing about 20 per cent. of phenols or tar acids, when made into a soap with common resin and an alkali, yielded a product which was an ideal larvicide, having excellent diffusive and toxic powers, and at the same time acted as a very efficient germicide. It diffused perfectly with water, forming a milky emulsion very destructive to mosquito larvæ and having a germicidal value equal to, or greater, than that of pure carbolic acid or a Rideal-Walker co-efficient to one to two. In this way a very valuable larvicide and disinfectant, miscible with water, was produced from a very inferior insoluble disinfectant.

The larvicidal powers, when tried on *Culex* and *Anopheles* larvæ, varied slightly with the quality of the crude carbolic acid, but an average result was as follows:—

- Dilution 1 to 1,000: *Culex* larvæ dead in 5 minutes.  
                           *Anopheles* larvæ, half grown, dead in 5 minutes.  
                           *Anopheles* larvæ, full grown, dead in 10 minutes.
- Dilution 1 to 5,000: *Anopheles* larvæ, half and full grown, dead in 5 minutes.  
                           *Culex* larvæ, half grown, dead in 3 minutes.
- Dilution 1 to 10,000: *Culex* larvæ, half grown, dead in 64 minutes.  
                           *Anopheles* larvæ, young, dead in 52 minutes.  
                           *Anopheles* larvæ, full grown, dead in 135 minutes.
- Dilution 1 to 15,000: Small *Culex* larvæ, dead in 32 minutes.  
                           *Anopheles* larvæ, full grown, dead in 123 minutes

Anopheline larvæ seem to be slightly more resistant than *Culex* larvæ, and all pupæ are more resistant than larvæ to the effects of the larvicide.

*Experiments with Agents Destructive to Vegetation, Grass, and Algæ.*—A series of experiments was carried out with the larvicide, caustic soda, arsenic, and copper sulphate, as to the amounts necessary in pools and lagoons to prevent the growth of vegetation and to determine the value of the resulting solutions as larvicides. Bermuda grass in sod was made into artificial ponds in large glass jars, and flooded with 0.5 per cent. solution of caustic soda, copper sulphate, and sulphuric acid. The sod was well soaked with the chemical solution, but the grass remained vigorous in each instance. The jars were undisturbed for a period of eighteen days, when a number of *Culex* larvæ were introduced into the solution of the artificial pools. The larvæ were killed within twenty-four hours in the pools containing copper sulphate and sulphuric acid; but those in the pool containing caustic soda remained alive several days. It was concluded from this that none of the above chemicals could be used with advantage in killing gross vegetable matters such as grasses, and none were of special value as larvicides.

An artificial pool, as above, was flooded with a 0.125 per cent. solution of sodium arsenite. All but three or four of the stalks of grass were killed and overgrown with mould, the withering effect becoming apparent in forty-eight hours. After nine days, when the grass was quite dead, several *Culex* larvæ were introduced into the pool, and were killed after one hour's exposure. The pool was twice flushed out to rid it of arsenic salt, but the grass showed no further signs of life at the end of thirty-five days. It was concluded from this that a 0.125 per cent. solution is a valuable agent in destroying gross vegetable forms, such as grass, and the resulting water in the pool remained effective as a larvicide.

The common green filamentous algæ, spirogyra, and *Culex* larvæ were introduced into small glass jars containing various high dilutions of copper sulphate and sodium arsenite. The results of two series of experiments showed that copper sulphate in dilutions up to 1 part in 500,000 is inimical to the growth of this algæ. They become greyish-green in colour, shrunken, and lose their fresh and crisp appearance. As a larvicide, however, copper sulphate is not destructive in dilutions higher than 1 in 50,000 parts. Sodium arsenite, on the contrary, seems to stimulate the growth of these algæ in all dilutions between 1 in 2,500 and 1 in 25,000,000, the algæ remaining green and vigorous. As a larvicide, *Culex* larvæ were destroyed in sodium-arsenite dilutions up to 1 in 100,000. The larvacidal powers of sodium arsenite solutions in contact with green algæ seem to vary within wide limits, depending probably upon the power of the algæ to take the arsenic salt out of solution into its protoplasm, thus rendering the surrounding solution less larvacidal. It is concluded from this that copper sulphate is more efficient than sodium arsenite as an algicide in high dilutions, but the arsenic salt is a better larvacidal agent.

*Composition and Size of Mesh of Wire Screening.*—Two extremely important factors in the use of wire screening for protection against mosquitoes are, first, the size of the mesh, and, secondly, the chemical

composition of the wire used. In regions where it is only necessary or desirable to protect against anophelines, a No. 16 mesh screening (16 holes to the inch) would answer the purpose; and where, as in this region, it is necessary to protect against some of the smaller varieties, such as *Stegomyia calopus*, a No. 16 mesh would be practically safe, but not absolutely so. The following experiments were conducted to determine the varieties of mosquitoes which would, under stress of circumstance, pass through a No. 16 mesh wire screening. Out of several hundred mosquitoes, eight common varieties were able to make their escape through a No. 16 mesh wire.

(a) A square wooden box, well ventilated, with fine crinoline gauze screening on two sides, and glass on the other two sides, with a central replaceable partition, covered with No. 16 mesh-wire screening, was constructed. Several dozen mosquitoes of the above varieties were liberated at a time on one side of the partition, where there was neither food nor water; on the opposite side, close to the screen partition, were placed water, banana, candy, sugar, and raisins as a bait. Only three mosquitoes, out of several hundred, of several varieties, passed through the No. 16 mesh partition under the conditions of the experiment. As the space containing the mosquitoes was about one-half of a cubic foot in volume, and as there were a few recesses in which the mosquitoes could hide, an electric light bulb was hung in such a position at night that the mosquitoes would be attracted by it, but this did not favour the passage of the mosquitoes through the screen. Tobacco fumes were passed into the mosquito department with a rubber-tube apparatus, but while this excited the mosquitoes, it did not cause any of them to escape through the screen. When a person's arm was introduced into the compartment close to the No. 16 mesh wire partition, it did not induce the mosquitoes to escape through the screening.

(b) Next a lantern chimney, covered on one side with fine mesh crinoline gauze, and on the other side with a metal collar, holding in place a piece of the No. 16 mesh wire screening, was partly filled with various mosquitoes and placed near the same bait, as before, under a large glass bell-jar. Eighteen mosquitoes escaped from the chimney through the No. 16 mesh screening into the surrounding jar. The close quarters and the absence of resting places in the chimney evidently favoured the escape of mosquitoes through the wire screening. On one occasion, by passing a gust of air through the lantern chimney jar, a male *Culex* was helped through and escaped.

Observations extending over a period of four years were made on screening made of copper and zinc, having the following composition:—

Copper	..	..	84.92	..	80.94	..	84.83	..	88.59	..	95.85
Zinc	..	..	..	..	..	..	14.90	..	..	..	4.15
Iron	..	..	..	..	..	..	0.06	..	0.04	..	0.0

The results showed that these resist the corroding actions of a hot, moist climate much better than screening made of brass with an average composition of: copper, 65; zinc, 34; iron,  $\pm 1$ ; and it is concluded that screening intended for use in the Tropics, exposed to heat and moisture, should have a high copper content, higher than brass, and be as free as possible from the presence of iron.

*Effect of Quinine on the Malarial Parasite, (a) in the Mosquito and (b) in Man.*—(a) Nearly all the infecting experiments were conducted on patients who were receiving the routine ward treatment of quinine, 10 grains, t.i.d., in solution, so that apparently quinine in these quantities has no destructive or inhibitive effect on the parasites in the mosquito, because the zygotes go on to maturity and the sporozoites appear in the salivary glands in from nine to eleven and a half days.

The tables given show that the effect of quinine administration, then, is to make the gametes gradually disappear from the peripheral blood by the destruction of the young forms. It is concluded that quinine, 10 grains, t.i.d., in solution will gradually reduce the sexual form of the parasite in man to a non-infective minimum in from a few days to a few weeks, depending on the severity of the infection.

In tertian malarial fever, the gametes disappear from peripheral blood within two or three days under quinine treatment, and generally disappear even when quinine is withheld, if the patient is at rest. There are never as many gametes in the peripheral blood in the tertian as in æstivo-autumnal malaria. As a consequence, in infected mosquitoes, æstivo-autumnal zygotes are more numerous than tertian zygotes.

*Latent Malaria among Labourers and their Families.*—This subject was taken up in March, 1909, during the dry season, when very few mosquitoes were breeding, so that the cases of malaria resulted more frequently from recrudescence than from new infections. In two locations, for instance—Spanish barracks at Ancon and Spanish barracks and negro quarters at Cucaracha—there were certainly no mosquitoes breeding and none were taken in quarters—good indications that there were no cases of new infections. On one day blood specimens were taken between 5 and 6 p.m., when the men were coming out from supper. Two hundred and thirty-seven specimens were taken from 269 labourers. In 29 cases there was evidence of latent malaria.

It was rather surprising to find that those with positive blood did not enter, while two with negative blood at the time developed symptoms and entered the hospital with tertian malaria.

The Spanish labourers at Cucaracha lived in screened quarters, and of 53 found at home one Sunday morning, the blood of 7 contained malarial parasites, 6 tertians, and one probably æstivo-autumnal—13.2 per cent.

From the examination of labourers at work, 8 to 13 per cent. of latent malaria was met with, chiefly of the tertian variety, in the proportion of about 4 of tertian to 1 of æstivo-autumnal. Among children and adults living in unscreened or recently screened barracks the percentage of latent malaria was, as previously indicated, much higher.

It is this latent, untreated malaria in every tropical community which contributes largely to the preservation of the malarial parasite, and to the infection of anophelines, when, after the onset of the rainy season, mosquitoes in numbers have begun to breed.

*Value of the Splenic Index in Determining the Amount of Malaria in a Community.*—The degree of splenic enlargement in a malarial region seems to depend on the following factors:—

- (a) Amount of blood destruction or loss.
- (b) Duration of the blood destruction.
- (c) Ability of the hemapoietic organs to regenerate red blood cells.

(d) Degree of reaction to the infection as in such infections as relapsing fever, where there is at first not a high degree of blood destruction, or, at any rate, the splenic enlargement is so rapid and the red count so little decreased, that the splenic enlargement is a measure of toxæmia rather than blood destruction. When there is much blood destruction or depletion, and the blood-forming organs are not passive, then the splenic enlargement will be considerable.

In this region there is a source of splenic enlargement which is confused with that of malaria, *i.e.*, uncinariasis. Some of the largest spleens encountered here are undoubtedly those secondary to uncinariasis anæmia. C. E. P.

**The Morphology of Malarial Plasmodia after the Administration of Quinine and in Intracorpuseular Conjugation.** Charles F. Craig (*Journal of Infectious Diseases*, March, 1910, vol. vii., p. 285), states that the changes which he has observed in living specimens of *Plasmodium vivax* to have been produced by quinine are:—

(1) An initial stimulation of amœboid activity, followed by a decrease and finally a cessation of motion.

(2) A granular degeneration of the protoplasm.

(3) An increased refractive index of the protoplasm.

(4) Fragmentation of the parasite followed by the apparent extrusion of the fragmented organism from the red corpuscle.

(5) A marked decrease in the amount of pigment developed in those parasites which undergo growth during the treatment with quinine.

The alterations in stained films are:—

(1) The chromatin stains more deeply. The unstained vesicular portion of the nucleus disappears.

(2) Fragmentation of both protoplasm and chromatin.

(3) Prevention of normal increase in the amount of chromatin and of normal division.

(4) The production of a typical sporulating plasmodia, in which many of the merozoites appear devoid of chromatin.

(5) Similar changes in the young gametes as regards the protoplasm and chromatin.

Many of these appearances are indefinite and may arise from small differences in technique. Moreover, the subjective element has not been excluded. It is to be regretted that the writer did not test the value of his observations by scientific methods. We look in vain for a statement of the percentage of his successes in deciding whether quinine had been given or not, by an examination of a thousand or more blood-films, the origin of which was unknown to him until after his decision.

He advocates the administration of quinine in moderate doses repeated every three or four hours. He states that he has seen very serious results follow one large dose of quinine in the æstivo-autumnal infections; some of the patients thus treated died from pernicious attacks which might have been controlled had the drug been given in divided doses at regular intervals. He says the large single dose invariably results in the febrile condition lasting several days.

Mannaberg stated many years ago that he had repeatedly seen two parasites in a red corpuscle coalesce and form one larger body. Ewing observed the same phenomenon, but considered it of rare occurrence.

Craig writes, "In fresh preparations the process may be followed in rare instances, and I have several times been so fortunate as to witness the complete union of the conjugants." Now this is but a slender foundation on which to build a theory of the cause of latency and recurrence in malarial fevers. The evidence obtained from stained films is inconclusive, though it is upon this that Craig relies. Therefore it is only with great reserve that we can accept Craig's interpretations of the photographs which illustrate his paper.

C. B.

**Isthmian Canal Commission, Report of the Department of Sanitation for September, 1910.**—On page 48 there is an interesting note on the habits of the Anopheles. It has been found by observation that Anopheles will enter a screened building at night more frequently through a hole in the floor than through a hole in the side of the building. It has also been determined that most of the Anopheles that hide in buildings and cannot be taken during the daytime make numerous attempts to leave the building after 6 p.m. or just before dark. At that time they can be quite easily seen on the screened windows and can be readily destroyed. This fact will be of considerable practical use in destroying infected Anopheles.

C. E. P.

**Malta Fever at Marseilles.**—The *Annales d'Hygiène et de Médecine Coloniales*, No. 1 of 1910, gives a short account of the research work carried out at the medical school for the Colonial forces, in certain cases of prolonged pyrexia. These were formerly regarded as atypical cases of typhoid, malaria, &c. On investigation, however, in seven cases the serum gave a positive Widal reaction with *Micrococcus melitensis*, while in one case a coccus was recovered from the blood of a patient which conformed to all the culture tests of *M. melitensis*. The clinical histories and temperature charts were typical of Malta fever.

Most of the patients resided in Marseilles, and had never been out of the country. Goat's milk, either fresh, curdled, or in the form of cheese, is a favourite article of diet.

C. E. P.

**Ten Years of Anti-malaria Legislation in Italy.** Dr. Bertarelli, Professor of Hygiene in the University of Parma (*Revue d'Hygiène et de Police sanitaire*, Tome xxxi., No. 1, January, 1909).—Professor Bertarelli gives a brief review of the anti-malaria legislation in Italy from 1900 to 1908, and the results obtained. He begins with a review of the main lines of defence against malaria, viz.: (1) Destruction of Anopheles; (2) mechanical protection against their bites; and (3) the administration of quinine to all persons living in malarial districts. The general destruction of mosquitoes would have been impossible owing to the enormous extent of their breeding places. The Government was, therefore, obliged to rely on the second and third plans.

Since the year 1900 several laws have been passed granting power to the executive Government to enforce anti-malaria measures. A beginning was made with the law of December 23rd, 1900, which authorized the Government to undertake the manufacture of quinine, and to retail it through chemists and licensed dealers in the Government monopolies (salt and tobacco). The quinine was put up in cachets, each containing

10 cgm.; ten cachets were packed in a sealed tube with printed directions, and retailed at the fixed price of 40 centimes for the chloride and 32 for the sulphate.

The preparation of the quinine was undertaken by the Central Military Pharmacy at Turin, and in a short time it was able to produce many thousands of pounds of the sulphate of quinine per annum. Some opposition was raised on the part of manufacturing and dispensing chemists, but this died away.

Owing to these arrangements a plentiful supply of quinine was placed within the reach of everyone in the malarious districts, as it could everywhere be purchased cheaply, even in the smallest villages. Further laws conferred power on the Government to declare the worst malarious districts "infected areas" (*zona malaria*). In such areas the following rules automatically became effective. The municipal authorities were obliged to distribute quinine as a prophylactic or for treatment to all agricultural labourers or employés as long as the district medical officer considered it advisable. Landowners were obliged to pay for this expenditure in proportion to the size of their holdings. Employés in public works were supplied with quinine at their employers' expense; any infringement of this law being punishable by fines of 100 to 1,000 francs. Death from malaria contracted in such employment was placed in the same category as death from accident due to employment. In the worst malarious districts quinine was supplied below cost price to employers of labour for distribution to their workmen and families. In the infected areas the houses of all public officials were made mosquito-proof. Employers of labour who did the same for their workmen were granted a bonus up to 1,000 francs, on the recommendation of the provincial medical council. Where feasible, landowners were obliged to fill up all pools.

In 1907 a special law was passed regulating the cultivation of rice. The chief points dealt with in this law were as follows: Dwelling-houses were not permitted to be within a prescribed distance of any rice field; efficient drainage of these fields had to be provided; the number of hours of labour were limited; mosquito-proof dwellings for the labourers were made compulsory; child labour under 14 years of age was prohibited.

The following table gives a concise summary of the results:—

CONSUMPTION OF STATE QUININE		DEATHS FROM MALARIA		NET PROFIT TO THE STATE FROM SALE OF QUININE
Years	Kilogrammes sold	Years	Total number	In £ sterling
—	—	1900	15,865	—
—	—	1901	13,388	—
1902-1903	2,242	1902	9,908	1,360
1903-1904	7,234	1903	8,519	7,321
1904-1905	14,071	1904	8,501	7,335
1905-1906	18,712	1905	7,838	11,851
1906-1907	20,723	1906	4,871	18,481
1907-1908	24,351	1907	4,160	24,000

C. E. P.

**The Development of a Quinine-resisting Strain of Malarial Parasite.** By Dr. Arthur Neiva ("Memorias de Instituto Oswaldo

Cruz," Tomo II., Faciculo I.)—Dr. Neiva was in charge of some 3,000 men for twenty months, who were occupied in building waterworks in an extremely malarious district in Brazil. Most of the men came from Rio. Dr. Neiva, as a result of his observations, has formed the following conclusions:—

(1) The quantity of quinine which at an early period of exposure was found to be capable of preventing an attack of yellow fever was insufficient to effect this object after prolonged exposure to infection.

(2) Persons who had taken quinine regularly, and remained free from malarial fever while in the affected area, suffered from attacks of malarial fever on giving up the regular use of quinine after their return to healthy districts.

(3) In order to obtain the same therapeutic effect the dose of quinine had to be increased in proportion to the length of exposure to infection.

In this district malaria is so general and of such a severe type that when the railway was being constructed through it all work had to be abandoned during the worst fever months. Drs. Chagas and Neiva were therefore commissioned to undertake an anti-malaria campaign with the object of enabling the construction of the waterworks to be carried on without interruption. The district was extremely swampy, and in many parts the men had to work up to their waists in water. The usual hours worked were fourteen a day, divided into eleven hours on a day shift and three hours on a night shift. The sleeping accommodation consisted of open grass huts.

Under these circumstances the only available means of combating malaria was by the regular administration of quinine. At first there was a good deal of opposition on the part of the men. Many of the men had their families with them; these refused to take the quinine, and there was no way of compelling them to do so.

From February till the middle of August a certain number of men were attacked by malarial fever, among whom a large proportion were primary infectious. These men had been taking quinine regularly. The same thing happened in September, although, in general, the quinine prophylaxis was successful; the families, on the other hand, suffered severely from malaria. Thus, there were two classes of persons living in close proximity—the workmen protected by quinine, and the families, traders, &c., who refused to take quinine and were saturated with malaria. Men who had taken quinine regularly and had never had fever while in the infected districts developed definite attacks soon after their arrival in Rio.

In October it was decided to administer the same dose of quinine to all men three times a week instead of twice as before. This stopped all attacks of fever among the men at work, but did not prevent the occurrence of attacks among men returning to Rio. When these men returned to work again they were a source of danger to their comrades, as they had become carriers of the malaria parasite.

By the middle of November malarial fever began to attack the men who were taking the quinine three times a week. It was therefore ordered that quinine should be taken daily. This had the effect of stopping all attacks. Men, however, who went to Rio were still attacked by fever there. One of the doctors, after returning to Rio, continued to

take quinine for twelve days and then discontinued it. Nine days afterwards he was attacked by malarial fever. Neiva thinks the only possible conclusion is that a strain of malaria parasite with a high degree of resistance to quinine had been produced, and in the following way: The *Anopheles* fed in turn upon the blood of local inhabitants, who formed the original source of infection, on the new-comer who had not yet taken any quinine, and on the workmen who were taking quinine every third day. In this way the hæmatozoa were given the opportunity of becoming acclimatised to quinine, and in the course of many generations acquired a very high resistance to it. In January, 1908, about 10 per cent. of some of the detachments had become gamete carriers. These persons were taking the same amount of quinine as the non-infected men, so that an *Anopheles* feeding on either of these classes always drew blood containing approximately the same quantity of quinine, and the parasite consequently became acclimatised and was soon able to complete its developmental cycle in the presence of quinine. The quinine-resisting powers of the parasite were thus being constantly raised.

Any intermission in taking the daily dose of quinine, even up to months after leaving this infected district, was followed by a sharp attack of malignant tertian fever.

Dr. Neiva draws the conclusion that if the prophylactic use of quinine is to be successful it must be enforced on every person living in the district.

C. E. P.

## Correspondence.

### MIDDLE-EAR DISEASE IN THE ARMY.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I think that there is a tendency to exaggerate the danger to which the subject of otorrhœa is exposed. Walker Wood, in the *Lancet* of October 22nd, 1910, p. 1210, quotes Haseler's statistics of the frequency of intracranial complications in 81,684 cases of suppuration of the middle ear; of these 116 succumbed. Death was caused by thrombosis in 48; by meningitis in 40; by brain abscess in 28.

Pitt's figures of the London hospitals give much the same fatality. Therefore, if a soldier be otherwise efficient, his services should not be lost to the country on account of a purulent discharge from his ear, since the chances against his falling a victim to its perils are 700 to 1. Indeed, a soldier who has contracted syphilis runs a greater risk; for the odds against his dying of secondary lesions are 500 to 1.

I am, &c.,

C. BIRT,

Lieutenant-Colonel, R.A.M.C.

Dublin,

April 10th, 1910.

## MIDDLE-EAR DISEASE IN THE ARMY.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—The following figures have been extracted from the Army Medical Department reports, and serve to show the importance of taking some steps to abolish what must be regarded to a great extent as a preventable disease:—

Year	Total admissions for ear disease	Sent home	Invalided	Deaths
1905 ..	2,186 ..	109 ..	201 ..	4
1906 ..	2,222 ..	114 ..	147 ..	6
1907 ..	2,158 ..	158 ..	160 ..	4
1908 ..	2,253 ..	112 ..	193 ..	8
Totals ..	8,819 ..	493 ..	701	
FIGURES FOR INDIA ONLY.				
1905 ..	1,060 ..	65 ..	56 ..	1
1906 ..	1,085 ..	92 ..	38 ..	2
1907 ..	1,105 ..	116 ..	61 ..	2
1908 ..	1,050 ..	69 ..	47 ..	2
Totals ..	4,300 ..	342 ..	202	

To the total number of deaths, others resulting from abscess of brain and meningitis should probably be added.

I am, &amp;c.,

F. J. W. PORTER, Major, R.A.M.C.

*Recruiting Medical Officer.*

## REJECTIONS FOR D. A. H.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—At Stratford recruiting depôt the rejections for D. A. H. have been rather frequent of late. One morning I found a small grave constructed in the front garden. A paper tombstone existed, with the following inscription:—

Sacred  
To the Memory of  
D. A. H.  
Who departed this Life  
Deeply mourned by his Relatives  
and a few friends.

Thrice blessed is he whose pulse is "slow,"  
Yea, verily, he is the last to "go below."

R.I.P.

I am, &amp;c.,

F. J. W. PORTER,  
*Major, R.A.M.C.*

Stratford,  
October 5th, 1910.

# INDEX TO VOLUME XV.

	PAGE		PAGE
Abscess, a case of hepatic, by Lieut. C. Clarke, clinical and other notes	486	Angio-neurotic œdema, with a record of two cases, by Capt. C. R. Sylvester Bradley, clinical and other notes	94
Abscess, liver, an important and easily preventable cause of death in the British Army, by Major Leonard Rogers, I.M.S.	155	Antiformin for the detection of tubercle bacilli in sputum, on the use of, &c., current literature	374
Africa, the German campaign in South-West, 1904-1906, by Lieut.-Col. C. H. Melville and Major C. E. Pollock	219, 335	Antityphoid vaccine, notes on six cases of enteric fever treated with, by Capt. H. T. Wilson, clinical and other notes	191
African War, medical history of South, by Lieut.-Col. R. J. S. Simpson	18, 257, 394, 533, 650	Army and navy, scurvy in the Russian, current literature	120
Aid Societies, course of instruction for delegates of voluntary, current literature	519	Army Medical Report of Russian Army for the year 1906, current literature	251
Aid Societies, voluntary, Germany, provision of medical stores, in peace, current literature	128	Army Medical Service, French, current literature	510
Alcohol, disinfection of the hands with, review of	372	Army, the A.B.C. of the, review of	507
Aldershot, short summary of the work at the Louise Margaret Hospital, during the year 1909, by Major S. F. Green, clinical and other notes	596	Aviss, W. G., Lieut., the treatment of Oriental sore, clinical and other notes	93
Ambulance dogs in France, current literature	380	<i>Bacillus coli</i> in the blood, by Capt. R. E. U. Newman and Major F. Smith	732
Ambulance trains, the improvisation of, current literature	245	Bacteria having unusual cultural characters, by Major J. C. B. Statham	673
Ambulance wagon Mark I., by Capt. A. R. Tweedie	695	Bacteriological flora, intestinal, of normal individuals in the Tropics, current literature	127
Ammunition, the new German "S," current literature	513	Balck, Capt. J. A., recruiting in the German Army	567
Anæsthetics, a practical guide to the administration of, review of	114	Balfour, Andrew, the spirochæte of Egyptian relapsing fever, is it a specific entity?	454
Anatomy, pathological atlas of, review of	509	Bateman, Capt. H. R., "Muhinyo," a disease of natives in Uganda	527
Anderson, Major J. B., technique for obtaining opsonic indices, clinical and other notes	184	Bateman, Capt. H. R., sleeping sickness in Uganda, duration of the infectivity of the <i>Glossina palpalis</i> after the removal of the Lake-shore population	133
Anderson, Brevet-Major W. H., inter-communication and orders	743		

	PAGE		PAGE
Bateman, Capt. H. R., the develop- ment of trypanosomes in tsetse-flies	422	Bruce, Col. Sir David, <i>Trypanosoma</i> <i>gambiense</i> ... ..	658
Bateman, Capt. H. R., <i>Trypanosoma</i> <i>gambiense</i> ... ..	658	Burke, Capt. B. B., the prevalence of middle-ear disease in the Army, with a suggestion for a remedy ... ..	487
Battlefield, removal of wounded from the, current literature ... ..	377	Butler, Capt. S. G., sub-periosteal re- section of the elbow-joint, clinical and other notes ... ..	85
Beri-beri in Cochin-China ... ..	648		
Bethuen, Lieut.-Col. R. M., notes on sanitation in the field in India ... ..	574		
Birt, Lieut.-Col. C., "Hata," dioxy- diamido-arseno-benzol ... ..	475		
Birt, Lieut.-Col. C., middle-ear disease in the Army, letter from ... ..	765	Cæcum, pityriasis rubra associated with ulcers or sloughs in the, by Capt. R. E. U. Newman, clinical and other notes ... ..	338
Birt, Lieut.-Col. C., sand-fly fever in India ... ..	140	Campaign, German, in South-West Africa, 1904-1906, by Lieut.-Col. C. H. Melville and Major C. E. Pollock... ..	219, 335
Birt, Lieut.-Col. C., simple modifica- tion of Wassermann's reaction ... ..	415	Carriers, sterilising the hands of typhoid, current literature ... ..	525
Blackham, Major R. J., the North- West Frontier of India .. ..	363	Carruthers, Lieut. V. T., perforation of duodenum, clinical and other notes .. ..	189
Blanket stretcher, improvised for mounted troops, current literature...	376	Cart, Scotch hay, and motor omnibus, adaptation of for carriage of wounded men, by H. E. R. James ... ..	69
Bond, Capt. J. H. R., long-continued fever, with marked enlargement of the spleen, cured by the use of senega, clinical and other notes ... ..	381	Cavalry, the disposal of the wounded of strategical, by Colonel H. G. Hathaway ... ..	308
Bousfield, Capt. L., tour of investiga- tion as to the prevalence of "kala- azar" in Kassala and Blue Nile dis- tricts, Sudan, from January 12th to May 16th, 1909 ... ..	161, 292	Cerebro-spinal meningitis in the French army, current literature ... ..	516
Bousfield, Capt. L., observation on human spirochetosis in the Sudan	444	Chemotherapy, the German Institute of, under the direction of Ehrlich ...	475
Boyce, Capt. W. W., a case of enteric fever with complications: opera- tion, recovery ... ..	480	Chest, pattern contents of (Medical Stores), current literature .. ..	130
Bradley, Capt. C. R. Sylvester, angio- neurotic œdema, clinical and other notes ... ..	94	Children, examination of elementary school, by Lieut.-Col. B. L. Mills, clinical and other notes ... ..	101
Bransbury, Capt. H. A., gonorrhœal keratosis ... ..	384	Civil hospitals and military con- valescent homes, Russian, current literature ... ..	252
British Army, liver abscess as an im- portant and easily preventable cause of death in the, by Major Leonard Rogers, I.M.S. ... ..	155	Clarke, Lieut. C., a case of hepatic abscess ... ..	486
Bruce, Col. Sir David, "Muhinyo," a disease of natives of Uganda ...	752	Clarke, Capt. J. B., fracture of the upper end of the radius through in- direct violence, clinical and other notes ... ..	197
Bruce, Col. Sir David, sleeping sickness in Uganda, duration of the infec- tivity of the <i>Glossina palpalis</i> after the removal of the Lake-shore popu- lation ... ..	133	Cocaine poisoning, fatal, correspon- dence, letter from Major F. J. W. Porter ... ..	258
Bruce, Col. Sir David, the development of trypanosomes in tsetse-flies ...	422	Commission, report of the Sanitation Isthmian Canal, current literature...	762

	PAGE		PAGE
Communication, lines of, a lecture, by Capt. A. W. Tufnell ... ..	202	Eczema in the Tropics, treatment of, by Major W. D. Sutherland, I.M.S., clinical and other notes ... ..	320
Congress of the Royal Sanitary Insti- tute, by Capt. C. H. Straton ..	734	Egyptian relapsing fever, the spiro- chaete of, by Andrew Balfour, M.D.	454
Congress, transactions of the Bombay Medical (1909), by Major W. S. Harrison ... ..	106	Elbow-joint, sub-periosteal resection of the, by Capt. S. G. Butler, clinical and other notes ... ..	85
Convalescent homes, Russian, current literature ... ..	252	Emergency ration, a suggestion for an, by Capt. C. Ryley ... ..	595
Crisp, Capt. G. B., notes on field hos- pitals in India... ..	593	Emerson, Capt. H. A., endocarditis treated by vaccine, clinical and other notes ... ..	588
Cyst, a case of multilocular, of the pancreas; operation and recovery, by Capt. H. C. Sidgwick, clinical and other notes ... ..	83	Enteric fever complications; opera- tion, recovery; by Capt. W. W. Boyce and Lieut. A. G. Wells, clinical and other notes ... ..	480
Defence of lines of communication. by Capt. A. W. Tufnell ... ..	213	Enteric fever in Kirkee in 1909, by Capt. C. Scaife, clinical and other notes ... ..	198
Dewberry, Serjt. E. B., notes on a new gravimetric method for the analysis of milk ... ..	494	Enteric fever, notes on six cases treated with antityphoid vaccine, by Capt. H. T. Wilson, clinical and other notes ... ..	191
Dioxy-diamido-arseno-benzol ("Hata," or "606"), syphilis treated with, by Major T. W. Gibbard and Capt. L. W. Harrison, clinical and other notes ... ..	581	Epidemic of dysentery in the camp of exercise at Hagenau in 1908, cur- rent literature ... ..	522
Diphtheria and pseudo-diphtheria bacilli, current literature ... ..	636	Equipment of the French infantry, current literature ... ..	125
Disinfection of the hands with alcohol, review of ... ..	372	Erskine, W. D., gastric ulcer with severe hæmorrhage ... ..	484
Disseminated sclerosis and notes on one case of primary spastic para- plegia, by Major W. S. Harrison ..	78	Exercises, medical, a manual of, review of ... ..	116
Dogs, French ambulance, current literature ... ..	380	Faichnie, Major N., long-continued fever with marked enlargement of the spleen cured by the use of senega, clinical and other notes ...	331
Donegan, Lieut.-Col. J. D. F., medical arrangements in savage warfare ... ..	496	Faichnie, Major N., nickel poisoning from drinking barley water ... ..	484
Drug Bill, review of ... ..	506	Falkner, Capt. M. W., a case of traumatic rupture of the jejunum, clinical and other notes ... ..	195
Duodenum, perforation at sea, by Lieut. V. T. Carruthers, clinical and other notes ... ..	189	Fever, enteric, notes on six cases treated with antityphoid vaccine, by Capt. H. T. Wilson, clinical and other notes ... ..	191
Dysentery, the epidemic of, in the camp of exercise at Hagenau, in 1908, current literature ... ..	522	Fever, enteric in Kirkee in 1909, by Capt. C. Scaife, clinical and other notes ... ..	198
Ear disease in the Army, correspon- dence, letter from Lieut.-Col. C. Birt	765		
Ear disease in the Army, by Capt. B. B. Burke, clinical and other notes ...	487		
Ear, diseases of, correspondence, letter from Major F. J. W. Porter 65, 131, 766			

	PAGE		PAGE
Fever, long-continued, with marked enlargement of the spleen cured by the use of senega, by Major N. Faichnie, and Capt. J. H. R. Bond, clinical and other notes ...	331	French infantry, equipment of, current literature ...	125
Fever, Mediterranean, in Gibraltar in 1909, by Capt. C. E. P. Fowler...	54	Frontier of India, North-West, by Major R. J. Blackham ...	363
Fever, Mediterranean treated with vaccines, by Major H. V. Prynnne, clinical and other notes ...	591	Fry, Capt. W. B., further results of experimental treatment of trypanosomiasis ...	1
Fever, sand-fly, in India, by Lieut.-Col. C. Birt ...	140	Gastric ulcer with severe hæmorrhage, by Major W. D. Erskine, clinical and other notes ...	484
Fever, the spirochæte of Egyptian relapsing, by Andrew Balfour ...	454	Geneva Convention, the, by Col. W. G. Macpherson, lecture...	607
French, Capt. E. G., surgical operations at Military Hospital, Edinburgh	727	German and English, medical vademecum in, review of ..	507
Field hospitals, notes on, in India, by Capt. G. B. Crisp ...	593	German army, medical report of, for 1905-1906, current literature ...	247
Firth, Brevet-Col. R. H., the routine examination of Indian water supplies	553	German army, recruiting in the, by Capt. J. A. Balck ..	567
Flies, tsetse-, the development of trypanosomes in, by Colonel Sir D. Bruce, and Captains A. E. Hamerton and H. R. Bateman, and Captain F. P. Mackie, I.M.S. ...	422	German Campaign in South-West Africa, 1904-1906, the, by Lieut. Col. C. H. Melville and Major C. E. Pollock, report ...	219, 395
Forman, Colonel R. H., sand-fly fever in India, correspondence ...	526	German medical organization, the new—for a cavalry division in the field, current literature ...	520
Fowler, Capt. C. E. P., Mediterranean fever in Gibraltar in 1909 ..	54	German "S" ammunition, the new, current literature ...	513
Fracture of the upper end of the radius through indirect violence, by Capt. J. B. Clarke, clinical and other notes	197	Germany, voluntary aid societies, provision of medical stores in peace, current literature ..	128
Fractures and separated epiphyses, review of ...	633	Gibbard, Major T. W., syphilis treated with dioxo-diamido-arseno-benzol ("Hata," or "GOG"), clinical and other notes ...	581
Fractures of the metatarsal bones, on the treatment of, by means of the "Klebrobinde," current literature ..	514	Gibraltar, Mediterranean fever in, in 1909, by Capt. C. E. P. Fowler ...	54
France, ambulance dogs in, current literature ..	380	<i>Glossina palpalis</i> , duration of the infectivity of, after the removal of the Lake-shore population, by Col. Sir David Bruce, Capts. A. E. Hamerton and H. R. Bateman, and Capt. F. P. Mackie, I.M.S. ...	133
Freeman, Major E. C., clearing hospitals and the territorial force ...	702	Goats, examination of, from the "Muhinyo" district to ascertain if they are reservoirs of the virus of Malta fever, by Col. Sir David Bruce, Capts. A. E. Hamerton and H. R. Bateman, and Capt. F. P. Mackie, I.M.S. ...	531
French army, issue of a wine ration in the, current literature ..	379	Gonorrhœal keratosis, by Capt. H. A. Bransbury, clinical and other notes	384
French army, prophylaxis of cerebrospinal meningitis in the, current literature ...	516		
French army (1907), the statistical report of the health of the, current literature ...	249		
French army, nursing sisters in, and regulations for employment of, current literature ...	117		

	PAGE		PAGE
Gotelee, Capt. H. E., a case of single kidney, clinical and other notes ...	86	Health, progress and administration in the West Indies, review of ...	114
Gravimetric method, notes on a new, for the analysis of milk, by Serjt. E. B. Dewberry, clinical and other notes ...	491	Hearing and military service, a comparison of the Army Medical Regulations of different countries, current literature ...	514
Hæmorrhage, gastric ulcer with severe, by Major W. D. Erskine, clinical and other notes ...	484	Heart, disordered action, rejections for, letter from Major F. J. W. Porter ...	766
Hamerton, Capt. A. E., "Muhinyo," a disease of natives in Uganda ..	527	Heart, the soldier's, by Lieut.-Col. R. J. S. Simpson and M. S. Pembrey, M.D. ...	712
Hamerton, Capt. A. E., sleeping sickness in Uganda—duration of the infectivity of the <i>Glossina palpalis</i> after the removal of the Lake-shore population ...	133	Heat-stroke, treatment of, current literature ...	519
Hamerton, Capt. A. E., the development of trypanosomes in tsetse-flies	422	Hepatic abscess, a case of, by Lieut. C. Clarke, clinical and other notes...	486
Hamerton, Capt. A. E., <i>Trypanosoma gambiense</i> ...	653	Hernia, the radical cure of inguinal, by Lieut.-Col. R. W. Wright, clinical and other notes ..	87
Hands, disinfection of the, with alcohol, review of ...	372	Hinge, Major H. A., the "Kenny" stretcher pillow, clinical and other notes ...	327
Hands, sterilising the, of typhoid carriers, current literature ...	525	Hospitals and the territorial force, clearing, by Major E. C. Freeman...	702
Harrison, Capt. L. W., syphilis treated with dioxy-diamido-arseno-benzol ("Hata," or "606") clinical and other notes ...	581	Hospitals, notes on field, in India, by Capt. G. B. Crisp, clinical and other notes ..	593
Harrison, Capt. L. W., the serum diagnosis of syphilis ...	35	Improvised blanket stretcher for mounted troops, current literature	376
Harrison, Major W. S., two cases of disseminated sclerosis, and one of primary spastic paraplegia ...	78	Improvised methods for conveyance of sick and wounded, by Lieut.-Col. H. E. R. James and Major C. E. Pollock...	276
Harrison, Major W. S., transactions of the Bombay Medical Congress, 1909	106	India, notes on field hospitals in, by Capt. G. B. Crisp ...	593
"Hata," dioxy-diamido-arseno-benzol, by Lieut.-Col. C. Birt, clinical and other notes ...	475	India, notes on sanitation in the field in, by Lieut.-Col. R. M. Bethuen ..	574
"Hata," dioxy-diamido-arseno-benzol, syphilis treated with, by Major T. W. Gibbard and Capt. L. W. Harrison	581	India, the North-West Frontier of, by Major R. J. Blackham ..	363
"Hata" for dermatology and syphilis, current literature ...	752	India, the routine examination of water supplies in, by Brevet-Col. R. H. Firth ...	553
Hathaway, Col. H. G., the disposal of the wounded of strategical cavalry	308	Indian "Medical Gazette," correspondence, letter by Major B. H. Scott	382
Health of the French army, year 1907, statistical report of, current literature ...	249	Indies (West), health progress and administration in the, review of ..	114
Health of the Service in campaigns, current literature ...	518	Infantry (French), equipment of, current literature ...	125
		Inguinal hernia, the radical cure of, by Lieut.-Col. R. W. Wright, clinical and other notes ...	87

	PAGE		PAGE
Intestinal bacteriological flora of normal individuals in the Tropics, current literature ... ..	127	Langrishe, Lieut. J. du P., re-inoculation against typhoid fever ...	731
Invaliding from ear diseases, correspondence, letter from Major F. J. W. Porter ... ..	131, 766	Law, sanitary, a manual of, review of ... ..	115
Iodine, its use in military work, by Lieut. T. J. Mitchell, clinical and other notes ... ..	603	Lay sisters, <i>personnel</i> of French army, current literature ... ..	117
Isthmian Canal Commission, current literature ... ..	762	Liver abscess as an important and easily preventable cause of death in the British Army, by Major Leonard Rogers, I.M.S. ... ..	155
James, Lieut.-Col. H. E. R., adaptation of motor omnibus and Scotch hay-cart for carriage of wounded men ... ..	69	Long-continued fever with marked enlargement of the spleen cured by the use of senega, by Major N. Faichnie and Capt. J. H. R. Bond, clinical and other notes ... ..	331
James, Lieut.-Col. H. E. R., notes on the conveyance of sick and wounded by rail, with special reference to improvised methods ... ..	276	Louise Margaret Hospital, short summary of the work at the, during the year 1909, by Major S. F. Green, clinical and other notes ... ..	596
Jameson, Capt. A. D., an analysis of five hundred cases of syphilis, clinical and other notes ... ..	98	Luce, Col. R. H., tactics of medical units ... ..	467
Jejunum, a case of traumatic rupture of the, by Capt. M. W. Falkner, clinical and other notes ... ..	195	Mackie, Capt. F. P., I.M.S., development of trypanosomes in tsetse-flies ... ..	422
Kennedy, Capt. J. C., vaccine treatment of Malta fever, clinical and other notes ... ..	317	Mackie, Capt. F. P., I.M.S., "Muhinyo," a disease of natives of Uganda ... ..	527
"Kenny" stretcher pillow, the, by Major H. A. Hinge, clinical and other notes ... ..	327	Mackie, Capt. F. P., I.M.S., sleeping sickness in Uganda, duration of the infectivity of the <i>Glossina palpalis</i> after the removal of the Lake-shore population ... ..	133
Kidney, a case of single, by Captain H. E. Gotelee, clinical and other notes ... ..	86	Mackie, Capt. F. P., I.M.S., <i>Trypanosoma gambiense</i> ... ..	653
Kala-azar, prevalence of, in Kassala and Blue Nile district, Sudan, from January 12th to May 16th, 1909, by Capt. L. Bousfield ... ..	161, 292	Macpherson, Col. W. G., the Geneva Convention, lecture ... ..	607
Kassala and Blue Nile, districts of, Sudan, a tour of investigation as to the prevalence of "kala-azar" in, from January 12th to May 16th, 1909, by Captain L. Bousfield ... ..	161, 292	Malaria legislation in Italy, ten years of anti-, current literature ... ..	762
Keratosiis, gonorrhoeal, by Capt. H. B. Bransbury ... ..	334	Malaria, studies in relation to, current literature ... ..	753
Lambelle, Capt. F. W., traumatic rupture of the ileum ... ..	725	Malarial parasite, development of a quinine-resisting strain of ... ..	763
Langrishe, Lieut. J. du P., nickel poisoning from drinking barley water ... ..	484	Malarial plasmodia after the administration of quinine, current literature ... ..	761
		Malingering, current literature ... ..	375
		Male nurses, practical nursing for, in the Royal Army Medical Corps and other Forces, review of ... ..	634
		Malta fever at Marseilles, current literature ... ..	762
		Malta fever, vaccine treatment of, by Capt. J. C. Kennedy, clinical and other notes ... ..	317

	PAGE		PAGE
Malta, sand-fly in, by Capt. P. J. Marett ... ..	286	Milk, notes on a new gravimetric method for the analysis of, by Sergeant E. B. Dewberry, clinical and other notes ... ..	494
Marching, equipment on the march ..	641	Military hospitals, a pharmacopœia for, correspondence ... ..	253
Marett, Capt. P. J., preliminary report on the investigation into the breeding-places of the sand-fly in Malta ... ..	286	Mills, B. L. Lieut.-Col. examination of elementary school children, clinical and other notes ... ..	101
Medical arrangements, in savage warfare, by Lieut.-Col. J. D. F. Donegan, lecture ... ..	496	Mitchell, Lieut. T. J., iodine—its uses in military work, clinical and other notes ... ..	603
Medical Congress, transactions of the Bombay (1909), by Major W. S. Harrison ... ..	106	Mobilisation and the quartermaster, by a Quartermaster ... ..	311
Medical exercises, a manual of, review of ... ..	116	Moore, Major G. A., nasal obstruction in adults ... ..	148
Medical history of the South African War, by Lieut.-Col. R. J. S. Simpson ... ..	18, 257, 894, 533, 659	Motor omnibus and Scotch hay-cart for carriage of wounded men, by Lieut.-Col. H. E. R. James ... ..	69
Medical service (lines of communication, the), a lecture given at Edinburgh, January 20th, 1910, by Capt. A. W. Tufnell ... ..	215	Mould, Major W. T., some hints on Staff tours ... ..	63
<i>Medical Gazette, Indian</i> , correspondence ... ..	256	Mounted troops, improvised blanket stretcher for, current literature ...	376
Medical organisation, the new German, for a cavalry division in the field, current literature ... ..	520	Muhinyo, a disease of natives in Uganda, by Col. Sir David Bruce, Capts. A. E. Hamerton, H. R. Bateman, and Capt. F. P. Mackie, I.M.S. ... ..	527
Medical report for 1905-1906 of German army, current literature ...	247	Multilocular cyst of the pancreas, operation and recovery of, by Capt. H. C. Sidgwick, clinical and other notes ... ..	83
Medical report of the Russian army for the year 1906, current literature	251	Nasal obstruction in adults, by Major G. A. Moore ... ..	148
Medical service, army, France, current literature ... ..	510	Newman, Capt. R. E. U., <i>Bacillus coli</i> in the blood, and complicated with malaria .. ..	732
Medical units, tactics of, by Col. R. H. Luce ... ..	467	Newman, Captain R. E. U., pityriasis rubra associated with ulcer or sloughs in the cæcum, clinical and other notes ... ..	383
Medicine and pharmacy, the compendium of, review of ... ..	634	Nickel poisoning from drinking barley water, by Major N. Faichnie and Lieut. J. Du P. Langrishe, clinical and other notes ... ..	484
Medicine, manual of tropical, review of ... ..	113	Nightingale, Florence, O.M., R.R.C., the life and work of, by Major C. E. Pollock... ..	383
Medicine, tropical, manual of, review of ... ..	113	Novocain and suprarenalin solutions	127
Mediterranean fever, treated with vaccines, by Major H. V. Prynne, clinical and other notes ... ..	591	Nurses of voluntary aid societies, female ... ..	637
Mediterranean fever in Gibraltar in 1909, by Major C. E. P. Fowler ...	54		
Melville, Lieut.-Col. C. H., the German campaign in South-West Africa, 1904 to 1906 ... ..	219, 335		
Meningitis in the French army, current literature ... ..	516		
Metatarsal bones, on the treatment of fractures of the, current literature	514		

	PAGE		PAGE
Nursing sisters in the French army, regulations for employment of, current literature ... ..	117	Pharmacopoeia for military hospitals, correspondence, letter from Lieut.-Col. J. du B. Whaite ... ..	253
Edema, angio-neurotic, with a record of two cases, by Capt. C. R. Sylvester Bradley, clinical and other notes ...	94	Pharmacopoeia, 1898, synopsis of the British, review of ... ..	635
Omnibus (motor) and Scotch hay-cart for carriage of wounded men, adaptation of, by H. E. R. James ..	69	Pharmacy, materia medica and therapeutics, elements of, review of ...	635
Operations, the after-treatment of, review of ... ..	242	Pillow, the "Kenny stretcher," by Major H. A. Hinge, clinical and other notes ... ..	327
Operative surgery, student's handbook of, review of ... ..	242	Pityriasis rubra associated with ulcer or sloughs in the cæcum, by Capt. R. E. U. Newman, clinical and other notes ... ..	383
Opsonic indices, technique for obtaining, by Major J. B. Anderson, clinical and other notes ... ..	184	Plimmer, H. G., further results of the experimental treatment of trypanosomiasis ... ..	1
Organisation and functions, administrative lines of communication, by Capt. A. W. Tufnell ..	209	Pocket case, a plea for an improved regulation, by Capt. H. T. Wilson, clinical and other notes ... ..	104
"Organotrope" and "parasitotrope," Ehrlich employs these terms to express the relative affinity of chemical substances for the tissues of the body and the invading parasite respectively ... ..	475	Poisoning, cocaine, fatal, letter from Major F. J. W. Porter ... ..	253
Oriental sore, the treatment of, by Lieut. W. G. Aviss, clinical and other notes ... ..	93	Poisoning, nickel, from drinking barley water, by Major N. Faichnie and Lieut. J. du P. Langrishe, clinical and other notes ... ..	484
Pancreas, a case of multilocular cyst of the, operation and recovery of, by Capt. H. C. Sidgwick ... ..	83	Pollock, Major C. E., Florence Nightingale, O M., R.R.C., life and work of... ..	383
Paraplegia, notes on, by Major W. S. Harrison ... ..	78	Pollock, Major C. E., notes on the conveyance of sick and wounded by rail, with special reference to improvised methods ... ..	276
Parasitology, a handbook of practical, review of ... ..	115	Pollock, Major C. E., the German campaign in South-West Africa, 1904-1906 ..	219, 335
Paris Radium Institute, a visit to the, by Major F. J. W. Porter, clinical and other notes ... ..	491	Porter, Major F. J. W., a visit to the Paris Radium Institute ... ..	491
Pathological anatomy, atlas of, review of ... ..	509	Porter, Major F. J. W., the continuous treatment of syphilis, clinical and other notes ... ..	200
Pembrey, M. S., the soldier's heart ...	718	Porter, Major F. J. W., fatal cocaine poisoning, correspondence ... ..	253
Perforation of duodenum at sea, by Lieut. V. T. Carruthers, clinical and other notes ... ..	189	Porter, Major F. J. W., invaliding from ear diseases, correspondence, 181, 651, 766	
Periosteal resection of the elbow-joint, by Capt. S. G. Butler, clinical and other notes ... ..	85	Porter, Major F. J. W., rejections for D. A. H., correspondence ... ..	766
Pharmacopoeia for military hospitals, correspondence, letter from Major F. J. Wade-Brown ... ..	181	Prophylaxis of cerebro-spinal meningitis in the French Army, current literature ... ..	516
		Pryorne, Major H. V., Mediterranean fever treated with vaccines, clinical and other notes ... ..	591

	PAGE
Quartermaster, mobilisation and the, by a Quartermaster ... ..	811
Quartermaster's Guide, the Territorial, review of ... ..	116
Radium Institute, a visit to the Paris, by Major F. J. W. Porter, clinical and other notes ... ..	491
Radius, fracture of the, by Capt. J. B. Clarke ... ..	197
Ration, in, the French army, issue of wine, current literature ... ..	379
Ration, a suggestion for an emergency, by Capt. C. Ryley ... ..	595
Recruiting in the German army, by Capt. J. A. Balck ... ..	567
Regulations for employment of nursing sisters in the French army, current literature ... ..	117
REVIEWS.—	
“A handbook of practical parasitology” ... ..	115
“A manual of medical exercises” ... ..	116
“A manual of sanitary law” ... ..	115
“A practical guide to the administration of anæsthetics” ... ..	114
“A system of syphilis” ... ..	241
“Atlas of pathological anatomy” ..	509
“Annals of Tropical medicine and parasitology” ... ..	632
“Diseases of the skin” ... ..	751
“Disinfection of the hands with alcohol” ... ..	372
“Electrical recording thermometers for clinical work” ... ..	508
“Elements of pharmacy, materia medica, and therapeutics” ... ..	635
“Fevers in the Tropics” ... ..	243
“Fractures and separated epiphyses” ..	633
“Health, progress and administration in the West Indies” ... ..	114
“How to cut the drug bill” ... ..	506
“Improvisation in field medical work” ... ..	372
“Manual of tropical medicine” ... ..	113
“Medical vade-mecum in German and English” ... ..	507
“Practical nursing for male nurses in the Royal Army Medical Corps and other Forces” ... ..	634
“Protozoology” ... ..	749
“Remedia Hoechst: pharmaceutical products, therapeutic sera and bacterial preparations” ..	509

	PAGE
“Sprains and allied injuries to joints” ... ..	751
“Student's handbook of operative surgery” ... ..	242
“Synopsis of the British pharmacopœia, 1898” ... ..	635
“The A. B. C. of the Army” ... ..	507
“The case against Christian science” ..	748
“The compendium of medicine and pharmacy” ... ..	634
“The after-treatment of operations” ..	242
“The territorial quartermaster's guide” ... ..	116
“The war of the secession, 1861-62, Bull Run to Malvern Hill” ... ..	629
“Vaccine therapy; its theory and practice” ... ..	631
Rides, Staff, by Major F. J. Wade-Brown, correspondence ... ..	254
Rogers, Major Leonard, I.M.S., liver abscess as an important and easily preventable cause of death in the British Army ... ..	155
Rupture, a case of traumatic, by Capt. M. W. Falkner, clinical and other notes ... ..	195
Russian army, army medical report for the year 1906 of, current literature ... ..	251
Russian army and navy, scurvy in the, current literature ..	120
Russo-Japanese War, wounds in the, current literature ... ..	380
Ryley, Capt. C., a suggestion for an emergency ration ... ..	595
Sand-fly fever in India, correspondence ... ..	526
Sand-fly fever in India, by Lieut.-Col. C. Birt ... ..	140
Sand-fly, preliminary report on the investigation into the breeding-places in Malta of the, by Capt. P. J. Marett ... ..	236
Sanitation, cantonment, current literature ... ..	647
Sanitation in the field in India, by Lieut. Col. R. M. Bethuon ..	574
Sanitary Institute, congress of the Royal, by Capt. C. H. Straton ...	734
Sanitary law, manual of, review of ...	115
Sarcoma of the upper jaw ... ..	730

	PAGE		PAGE
Savage warfare, medical arrangements in, by Lieut.-Col. J. D. F. Donegan, lecture ... ..	496	Sore, treatment of Oriental, by Lieut. W. G. Aiviss, clinical and other notes	98
Scaife, Capt. C., enteric fever in Kirkee in 1909, clinical and other notes ...	198	South African War, medical history of, by Lieut.-Col. R. J. S. Simpson	18, 257, 394, 533
School children, examination of elementary, by Lieut. Col. B. L. Mills, clinical and other notes ... ..	101	South-West Africa, 1904-1906, the German campaign in, by Lieut.-Col. C. H. Melville and Major C. E. Pollock .. .. .	219, 335
School for medical officers, United States army ... ..	639	Spastic paraplegia, notes on one case of primary, by Major W. S. Harrison	78
Scotch hay-cart and motor omnibus, adaptation of, for carriage of wounded men, by Lieut.-Col. H. E. R. James ... ..	69	Spirochaete of Egyptian relapsing fever, the, is it a specific entity? by Andrew Balfour ... ..	454
Scott, Major B. H., <i>Indian Medical Gazette</i> , correspondence ... ..	256, 382	Spirochaetosis, observations on human, in the Sudan, by Capt. L. Bousfield	444
Scurvy in the Russian army and navy, current literature ... ..	120	Spleen, long-continued fever with marked enlargement of, by Major N. Faichnie and Capt. J. H. R. Bond, clinical and other notes ...	331
Senega, long-continued fever, with marked enlargement of the spleen, cured by the use of, by Major N. Faichnie and Capt. J. H. R. Bond, clinical and other notes ...	331	Staff rides, correspondence ... ..	254, 381
Serum diagnosis of syphilis, by Capt. L. W. Harrison ... ..	35	Statham, Major J. C. B., outbreak of malaria fever due to bacteria ...	673
Sick and wounded, conveyance by rail of, by Lieut.-Col. H. E. R. James and Major C. E. Pollock ... ..	276	Statistics, the German, current literature ... ..	249
Sidgwick, Capt. H. C., a case of multi-ocular cyst of the pancreas. operation and recovery of, clinical and other notes ... ..	83	Statistics, German, British, Bavarian, Austrian, Belgian, Spanish, Italian, Russian, American, Dutch, current literature .. .. .	249
Sierra Leone Protectorate, a surgical week-end in the, by Major F. J. W. Porter, correspondence ... ..	256	Sterilisation of novocain and suprarenalin solutions, current literature	127
Simpson, Lieut. Col. R. J. S., medical history of the South African War .. .. .	18, 257, 394, 533, 659	Strategical cavalry, the disposal of the wounded of, by Col. H. G. Hathaway ... ..	308
Simpson, Lieut.-Col. R. J. S., the soldier's heart... ..	712	Straton, Capt. C. H., congress of the Royal Sanitary Institute ... ..	734
Sleeping sickness in Uganda, duration of the infectivity of <i>Glossina palpalis</i> after the removal of the Lake-shore population, by Col. Sir David Bruce, Capt. A. E. Hamerton, H.R. Bate-man, and Capt. F. P. Mackie, I.M.S.	133	Stretcher, improvised blanket, current literature ... ..	376
Sloughs in the caecum, by Capt. R. E. U. Newman ... ..	333	Stretcher pillow, the "Kenny," by Major H. A. Hinge, clinical and other notes ... ..	327
Smith, Major F., <i>Bacillus coli</i> in the blood ... ..	732	Surgery, student's handbook of operative, review of ... ..	242
Solutions, novocain and suprarenalin, the sterilisation of, current literature	127	Sutherland, Major W. D., I.M.S., the treatment of eczema in the Tropics, clinical and other notes ... ..	320
		Syphilis, a system of, review of ...	241
		Syphilis, treated with dioxy-diamido-arseno- benzol ("Hata," or "606"), by Major T. W. Gibbard and Capt. L. W. Harrison, clinical and other notes ... ..	581

	PAGE		PAGE
Syphilis, serum diagnosis of, by Capt. L. W. Harrison	85	Tufnell, Capt. A. W., lines of communication, with special reference to the medical services	202
Syphilis, analysis of five hundred cases of, by Capt. A. D. Jameson, clinical and other notes	98	Tweedie, Capt. A. R., ambulance wagon Mark I.	695
Syphilis, the continuous treatment of, by Major F. J. W. Porter, clinical and other notes	200	Typhoid carriers, sterilising the hands of, current literature	525
Thermometers for clinical work, electrical recording, review of	508	Typhoid fever, epidemic of, in the garrison of Saint-Brieuc in 1909, current literature	374
Tour of investigation as to the prevalence of "kala-azar" in Kaesala and Blue Nile districts	161, 292	Typhoid fever, re-inoculation against, by Lieut. J. du P. Langrishe	731
Tours, some hints on Staff, by Major W. T. Mould	68	Typhoid media, current literature	123
Trains, improvised ambulance, by Lieut.-Col. H. E. R. James and Major C. E. Pollock	277	Uganda, "Muhinyo" a disease of natives in, by Col. Sir David Bruce, Capts. A. E. Hamerton and H. R. Bateman, and Capt. F. P. Mackie, I.M.S.	527
Traumatic rupture of the ileum, by Capt. F. W. Lambelle	725	Uganda, sleeping sickness in, duration of the infectivity of the <i>Glossina palpalis</i> after the removal of the Lakeshore population, by Col. Sir David Bruce, Capts. A. E. Hamerton and H. R. Bateman, and Capt. F. P. Mackie, I.M.S.	133
Traumatic rupture of the jejunum, a case of, by Capt. M. W. Falkner, clinical and other notes	195	Ulcer, gastric, with severe hæmorrhage, by Major W. D. Erskine, clinical and other notes	484
Travel, the North-West Frontier of India, by Major R. J. Blackham	363	Ulcer or sloughs in the cæcum, pyriasis rubra associated with, by Capt. R. E. U. Newman, clinical and other notes	333
Tropical medicine, manual of, review of	113	UNITED SERVICES MEDICAL SOCIETY—Address by the President	708
Tropics, fevers in the, review of	243	Sclerosis, two cases of disseminated, by Major W. S. Harrison	78
Tropics, intestinal bacteriological flora of normal individuals in the, current literature	127	The soldier's heart, by Lieut.-Col. R. J. S. Simpson and M. S. Pembrey, M.D.	172, 718
Tropics, the treatment of eczema in the, by Major W. D. Sutherland, I.M.S., clinical and other notes	320	Vaccine, antityphoid, six cases of enteric fever treated with, by Capt. H. W. Wilson, clinical and other notes	191
<i>Trypanosoma gambiense</i> as a reservoir of the virus of sleeping sickness, by Col. Sir David Bruce, Capts. A. E. Hamerton and H. R. Bateman, and Capt. F. R. Mackie, I.M.S.	653	Vaccine, endocarditis treated by, by Capt. H. A. Emerson, clinical and other notes	588
Trypanosomes in tsetse-flies, the development of, by Col. Sir David Bruce, Capts. A. E. Hamerton and H. R. Bateman, and Capt. F. P. Mackie, I.M.S.	422	Vaccine treatment of Malta fever, by Capt. J. C. Kennedy, clinical and other notes	317
Trypanosomiasis, further results of the experimental treatment of, by H. G. Plimmer and Capt. W. B. Fry	1		
Tsetse-flies, the development of trypanosomes in, by Col. Sir David Bruce, Capts. A. E. Hamerton and H. R. Bateman, and Capt. F. P. Mackie, I.M.S.	422		

	PAGE		PAGE
Vaccines, a case of Mediterranean fever treated with, by Major H. V. Prynn, clinical and other notes ...	591	Wells, Lieut. A. G., a case of enteric fever with complications; operation, recovery ...	480
Venereal syphilis, non-, current literature ...	636	West Indies, health, progress and administration in the, review of ...	114
Vision and its bearing on fitness for service ...	640	Whaite, Lieut.-Col. T. du B., pharmacopœia for military hospitals ...	253
Wade-Brown, Major F. J., pharmacopœia for military hospitals, correspondence ...	181	Wilson, Capt. H. T., notes on six cases of enteric fever treated with anti-typhoid vaccine, clinical and other notes ...	191
Wade-Brown, Major F. J., Staff rides ...	254	Wilson, Capt. H. T., a plea for an improved regulation pocket case, clinical and other notes ...	104
War, medical history of the South African, by Lieut.-Col. R. J. S. Simpson ...	18, 257, 394, 533, 659	Wine, issue of a ration in the French army of, current literature ...	379
Warfare, medical arrangements in savage, by Lieut.-Col. J. D. F. Donegan ...	496	Wounded, considerations affecting the evacuation of, current literature ..	244
Wassermann's reaction, a simple modification of, by Lieut.-Col. C. Birt ...	415	Wounded of strategical cavalry, the disposal of the, by Col. H. G. Hathaway ...	308
Water, provision for drinking for the soldier ...	647	Wounds in the Russo-Japanese War, current literature ...	380
Water supplies, the routine examination of Indian, by Brevet-Col. R. H. Firth ...	553	Wright, Lieut.-Col. R. W., the radical cure of inguinal hernia, clinical and other notes ...	87

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REMOVED FROM THE CORPS AND STILL  
ON THE ACTIVE LIST,

OFFICERS OF THE ROYAL ARMY MEDICAL  
CORPS

AND

RE-EMPLOYED RETIRED OFFICERS.

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SEPTEMBER, 1910.

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*[This List is prepared according to the latest information contained in Official Returns. Officers are requested to register any Diplomas or special qualifications at Headquarters, War Office, in order that this list may be published as complete as possible.]*

## SPECIALIST CERTIFICATES IN :

- a - State Medicine (R.A.M. College qualification).
- b = Diploma in Public Health.
- c = Bacteriology.
- d - Dental Surgery.
- e - Dermatology and Venereal Diseases
- f = Specific Fevers.
- g - Laryngology.
- h = Midwifery and Gynecology.
- j = Operative Surgery.
- k = Ophthalmology.
- l = Otology.
- m = Paediatrics.
- n = Psychological Medicine
- o = Skiagraphy.
- p = Diploma in Tropical Medicine
- r - Physical Training.

# ARMY MEDICAL SERVICE.

## HEADQUARTER STAFF.

Rank.	Name	Appointment.
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Colonel (temp. Surgeon-General)	Babbie, W., V.C., C.M.G., M.B.	Deputy Director-General.
Lieutenant-Colonel .	Burtchell, C. H., M.B. .. ..	Assistant Director-General.
" "	Eckersley, E., M.B. .. ..	Deputy Assistant Director-General.
Major ..	Birrell, E. T. F., M.B. . . .	" " " "
" "	Scott, B. H. . . . .	" " " "
" "	Pollock, C. E. . . . .	" " " " (attached to the Department of the Director of Military Operations).

## ARMY MEDICAL SERVICE ADVISORY BOARD.

Rank	Name.	Appointment
Colonel ..	Bruce, Sir D., Knt., C.B., F.R.S., M.B.	Expert in Tropical Diseases.
Major .	Horrocks, W. H., M.B. .. ..	Expert in Sanitation.

## ROYAL ARMY MEDICAL COLLEGE.

Rank	Name.	Appointment.
Colonel .	Wardrop, D., C.V.O., M.B. ..	Commandant and Director of Studies
Major	Pilcher, E. M., D.S.O., M.B., F.R.C.S. Eng	Professor of Military Surgery.
" ..	Harrison, W. S., M.B. .. ..	" Tropical Medicine.
Lieutenant-Colonel .	Melville, C. H., M.B. .. ..	" Hygiene.
Major (Brevet-Lieutenant Colonel)	Leishman, Sir W. B., Knt., F.R.S., M.B.	" Pathology.
Major .	Wanhill, C. F. . . . .	Assistant Professor of Hygiene.
Captain	Kennedy, J. C., M.D. . . .	" Pathology
Major ..	Gibbard, T. W., M.B. . . .	Lecturer in Syphilology.

## SURGEON GENERALS.

Name.	Station	Appointment.
Bourke, G. D., C.B., K.H.P.	Dublin .. ..	Principal Med. Officer, Irish Command
Dorman, J. C., C.M.G., M.B., K.H.P.	London .. ..	" " " Eastern Command.
Gallwey, Sir T. J., K.C.M.G., C.B., M.D.	Aldershot .. ..	" " " Aldershot Command.
Kenny, W. W., M.B., F.R.C.S.I., K.H.S.	York . . . .	" " " Northern Command
Lloyd, O. E. P., V.C., C.B.	South Africa .. ..	" " " "
Sloggett, A. T., C.B., C.M.G.	Poona, India . . .	" " " 6th (Poona) Division
Trevor, F. W., C.B., M.B., K.H.S.	Simla, India .. ..	" " " His Majesty's Forces in India.
Whitehead, H. R., C.B., F.R.C.S. Eng.	Salisbury .. ..	" " " Southern Command
MacNeece, J. G. .. ..	Naini Tal, India ..	" " " 8th (Lucknow) Division.

## COLONELS.

Name.	Station.	Appointment.	Specialist Certifi- cates in
Anderson, L. E. . . . .	Allahabad, India ..	Leave .. .. .	—
Babbie, W., V.C., C.M.G., M.B. (Temp. Surg.-Gen.)	War Office, London ..	Headquarter Staff .. ..	—
Bedford, W. G. A., C.M.G., M.B.	Hong Kong .. ..	Prin. Med. Officer, South China..	—
Bruce, Sir D., Knt., C.B., F.R.S., M.B.	London .. ..	Expert in Tropical Diseases, Army Medical Advisory Board	—
Butt, E., F.R.C.S.I. . . .	Darjeeling, India ..	P.M.O., Presidency and Assam Brigades	—
Corker, T. M., M.D. . . .	Egypt .. ..	P.M.O. and O.C. R.A.M.C. . .	—
Croly, A. E. J., F.R.C.S.I.	Dover .. ..	Administrative Medical Officer ..	—
Culling, J. C. . . . .	Prospect, Bermuda ..	Senior Med. Officer and Officer in charge Mil. Hosp. and Officer Command. 25th Coy. R.A.M.C.	—
Dodd, J. R., M.B., F.R.C.S.Eng.	Cork .. ..	Administrative Medical Officer ..	b.
Forman, R. H., M.B. . . .	Bombay, India .. ..	Principal Medical Officer, Bombay Brigade	—
Ford, R. W., D.S.O. . . .	Tidworth .. ..	Administrative Medical Officer ..	—
Hathaway, H. G. . . . .	Portsmouth .. ..	" " " " " "	—
Jennings, R., M.D. . . .	Devonport .. ..	" " " " " "	—
Kerin, M. W., C.B. . . .	Naini Tal, India ..	Offg. "Prin. Med." Officer, 8th Lucknow Division	—
Lucas, T. J. R., C.B., M.B.	Cherat, India .. ..	P.M.O., 1st (Peshawar) Division	—
MacNeece, T. F. . . . .	Chatham .. ..	Administrative Medical Officer ..	—
Maclean, F. B. . . . .	Meerut, India .. ..	Leave .. .. .	—
Murray, H. W., M.B. . . .	Gibraltar .. ..	Principal Medical Officer.. ..	—
Moberley, H. J. R. . . .	Bangalore, India ..	P.M.O. Bangalore and Southern Brigades	—
Macpherson, W. G., C.M.G., M.B.	Malta . . . .	Prin. Med. Officer, Malta.. ..	b.
O'Connor, A. P., C.B., F.R.C.S.I.	Colchester .. ..	Administrative Medical Officer	—
O'Keefe, M. W. . . . .	London .. ..	Inspector of Medical Services ..	—
O'Donnell, T. J., D.S.O. . .	India .. ..	Leave .. .. .	—
Peterkin, A., M.B. . . .	London .. ..	Prin. Med. Off., London District	—
Porter, R., M.B. . . . .	Chester .. ..	" " " " " " Western Command	—
Robinson, G. W. . . . .	Cape Town, South Africa	Admin. Med. Officer, C.C. and O.F.S.	—
Robinson, S. C. B. . . .	Jubbulpore, India ..	Prin. Med. Officer, Jubbulpore and Jhansi Brigades	—
Sawyer, R. H. S., M.B., F.R.C.S.I.	Dublin .. ..	Administrative Medical Officer ..	—
Wardrop, D., C.V.O., M.B.	R.A.M. College .. ..	Com. and Director of Studies ..	—
Woodhouse, T. P. . . . .	Edinburgh.. ..	Prin. Med. Officer, Scottish Com.	—

## LIEUTENANT-COLONELS.

(Under Article 365 of the Royal Warrant.)

Baker, W. J. . . . .	Cairo, Egypt .. ..	Officer in charge Military Hospital, and Officer Commanding 33rd Coy. R.A.M.C.	—
Battersby, J., M.B., F.R.C.S.I.	Secunderabad, India ..	Leave .. .. .	—
Birrell, W. G., M.B. . . .	Mauritius .. ..	Senior Medical Officer .. ..	—
Barratt, H. J. . . . .	Port Canning, St. Setts.	" " " " " "	b.
Burton, F. H. M., M.D. . .	Colchester .. ..	Officer in charge Military Hospital	—
Rond, R. P. . . . .	Chatham .. ..	" " " " " "	—
Braddell, M. O'D., M.B.	Lahore, India .. ..	" " " " " "	—
Beevor, W. C., M.B., C.M.G.	Bangalore, India ..	Officer in charge Military Hospital	—
Dick, W., M.B., F.R.C.S. Edin.	Woolwich .. ..	Sick leave .. .. .	b.
Dodd, A. . . . .	Chester .. ..	Officer in charge Military Hospital and Officer Commanding 19th Coy. R.A.M.C.	—

	Name.	Station.	Appointment.	Specialist Certifi- cates in
	nnet, J. J. C. . . . .	Belfast . . . . .	Officer in charge Military Hospital and Officer Commanding 15th Coy. R.A.M.C.	—
~	Firth, R. H., F.R.C.S. Eng. (Brevet-Colonel)	Simla, India . . . . .	Sanitary Officer Army Head- quarters	b.
	Faunce, C. E. . . . .	Gibraltar . . . . .	Officer in charge Military Hospital	—
	Geddes, R. J., D.S.O., M.B.	Jubbulpore, India . . . . .	" " " "	b.
	Gubbin, G. F. . . . .	Colaba, India . . . . .	" " " "	—
	Heffernan, W. . . . .	Pembroke Dock . . . . .	" " " "	—
	Hackett, R. I. D., M.D. . . . .	Pretoria, South Africa . . . . .	" " " " and O.C. 23rd Coy. R.A.M.C.	—
	Hamilton, T. W. O. H., C.M.G., M.B.	Warley . . . . .	Officer in charge Military Hospital	—
	Houston, F. S., C.M.G., F.R.C.S.I.	Edinburgh . . . . .	Officer in charge Military Hospital and O.C. 13th Coy. R.A.M.C.	—
	Irwin, J. M., M.B. . . . .	Woolwich . . . . .	Acting A.M.O. . . . .	—
	Johnston, H. H., C.B., M.D.	Curragh . . . . .	Officer in charge Military Hospital and Officer Commanding 17th Coy. R.A.M.C.	b.
*	Jencken, F. J., M.B. . . . .	Netley . . . . .	Officer in charge Royal Victoria Hospital	b.
	Kirkpatrick, R., C.M.G., M.D.	Devonport . . . . .	Officer in charge Military Hospital and O.C. 7th Coy. R.A.M.C.	—
	Lambkin, F. J. (Bt.-Col.)	Bloemfontein . . . . .	Officer in charge Military Hospital	—
	Lynden Bell, E. H. L., M.B.	Meerut, India . . . . .	" " " "	—
	Morse, R. E. R. . . . .	Cosham . . . . .	" " " " and Officer Commanding 6th Coy. R.A.M.C.	—
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	McGill, H. S. . . . .	Secunderabad, India . . . . .	Officer in charge Military Hospital	b. p.
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	Noding, T. E. . . . .	Cork . . . . .	" " " " and Officer Commanding 16th Coy. R.A.M.C.	—
	Nichols, F. P., M.B. . . . .	Fort Regent, Jersey . . . . .	Senior Medical Officer and in charge Military Hospital . . . . .	—
	Nichol, C. E., D.S.O., M.B.	Maymyo, India . . . . .	Officer in charge Military Hospital	—
	O'Connell, D. V., M.D. . . . .	Shoruckliffe . . . . .	" " " "	b.
	Pike, W. W., D.S.O., F.R.C.S.I.	Tidworth . . . . .	" " " " and O.C. 20th Coy. R.A.M.C.	—
	Rhodes, J. H. A. . . . .	Tralee . . . . .	Officer in charge Military Hospital	—
	Risk, E. J. E. . . . .	Belfast . . . . .	Administrative Medical Officer . . . . .	—
	Reade, W. L. . . . .	Dublin . . . . .	Officer in charge Royal Infirmary and Officer Commanding 14th Coy. R.A.M.C.	—
	Reid, J. M., M.D. . . . .	London Recruiting District . . . . .	Senior Medical Officer . . . . .	—
	Russell, A. F., C.M.G., M.B.	Cottouera, Malta . . . . .	Officer in charge Military Hospital and O.C. 30th Coy. R.A.M.C.	—
	Skinner, R. M., M.V.O. . . . .	Peshawar, India . . . . .	Officer in charge Military Hospital	—
	Simpson, R. J. S., C.M.G., M.B.	Woolwich . . . . .	" " " " Medical Division Royal Herbert Hospital	—
	Sloggett, H. M. . . . .	Aldershot . . . . .	Officer in charge Connaught Hosp.	—
	Townsend, S., M.D. . . . .	Canterbury . . . . .	" " " " Military Hospital	—
	Treherne, F. H., F.R.C.S. Edin.	Aldershot . . . . .	" " " " Cambridge Hosp.	b.
	Trevor, H. O. . . . .	Jamaica . . . . .	Senior Medical Officer and Officer Commanding R.A.M.C.	—
	Tyrrell, C. R. . . . .	Bordon . . . . .	Administrative Medical Officer . . . . .	—
	Thomson, W. B. . . . .	Calcutta, India . . . . .	Officer in charge Military Hospital	—
	Tate, A. E. . . . .	Ambala, India . . . . .	" " " "	—
	Westcott, S., C.M.G. . . . .	Mhow, India . . . . .	" " " "	b.
	Wilson, G., M.B. . . . .	Dover . . . . .	" " " "	—
	Winter, T. B. . . . .	Chakrata, India . . . . .	Officer in charge Military Hospital	b.

## LIEUTENANT-COLONELS.

Name.	Station.	Appointment.	Specialist Certifi- cates in
Adams, G. G. .. ..	Hyderabad, India ..	Officer in charge Military Hospital	—
Allen, S. G. .. ..	London .. ..	Recruiting duties .. ..	b.
Adamson, H. M., M.B. ..	Newcastle .. ..	Officer in charge Military Hospital	—
Aldridge, A. R., M.B. ..	Aldershot .. ..	In charge School of Army Sanitation and Instructor R.A.M.C. School of Instruction	b.
Austin, H. W. .. ..	Deeptut and Blackdown ..	Officer in charge Detention Hosp.	—
Brazier-Creagh, G. W., C.M.G.	Lichfield .. ..	„ „ Military Hospital	—
Birt, C. .. ..	London .. ..	„ „ „ „	—
Berryman, W. E. ....	Fyzabad, India .. ..	Officer in charge Military Hospital	—
Blackwell, C. T., M.D. ..	Woolwich .. ..	„ „ Auxiliary Hospital and Garrison Sanitary Officer	b.
Buchanan, J. B. W., M.B.	Londonderry .. ..	Officer in charge Military Hospital	—
Brown, H. H., M.B. ..	Murree, India .. ..	„ „ „ „	—
Burtchaell, C. H., M.B. ..	War Office, London ..	Headquarter Staff .. ..	b.
Barfoot, G. H. .. ..	Bareilly, India .. ..	Officer in charge Military Hospital	—
Bate, A. L. F. .. ..	Rawalpindi, India ..	Temp. Off. in charge Mil. Hosp.	—
Caldwell, R., F.R.C.S. Eng.	S. Africa .. ..	Sanitary Officer .. ..	b.
Cree, G. .. ..	Madras, India .. ..	Officer in charge Military Hospital and in charge His Excy. The Governor's Body Guard	—
Carr, H., M.D. .. ..	Jullundur, India .. ..	Officer in charge Military Hospital	—
Cree, H. E. .. ..	Jhansi, India .. ..	„ „ „ „	—
Cock, H., M.B. .. ..	Woolwich .. ..	„ „ „ „	—
Clarkson, T. H. F. ..	Tower of London .. ..	Officer in charge Military Hospital	—
Cottell, R. J. C. .. ..	Royal Hospital, Chelsea ..	Physician and Surgeon .. ..	b.
Daly, J. H. .. ..	Tipperary .. ..	Officer in charge Military Hospital	—
Daly, T. .. ..	Dalhousie, India .. ..	„ „ „ „	—
Davidson, J. S., M.B. ..	Allahabad, India .. ..	„ „ „ „	—
Donagan, J. F. .. ..	Parkhurst .. ..	„ „ „ „	—
Donaldson, J. .. ..	Aldershot .. ..	„ „ „ „	—
Elkington, H. P. G. ..	Queenstown .. ..	„ „ „ „	b.
Eckersley, E., M.B. ..	War Office, London ..	Headquarter Staff .. ..	b.
Forrest, J. R. .. ..	Buttevant .. ..	Officer in charge Military Hospital	b.
Fletcher, H. J., M.B. ..	Sialkot, India .. ..	„ „ „ „	—
Ferguson, N. C., C.M.G., M.B.	Millbank, London ..	Assistant to Officer in charge Military Hospital	b.
Fallon, J. .. ..	Preston .. ..	Officer in charge Military Hospital	—
Fayrer, Sir J., Bt, M.D., F.R.C.S. Edin.	Hong Kong .. ..	„ „ „ „	—
Green, J. S. M.B. .. ..	Nasrabad, India .. ..	and O.C. 27th Coy. R.A.M.C.	—
Gordon, P. C. H. .. ..	„ „ „ „	Leave .. ..	—
Gordon-Hall, F.W.G., M.B.	Glasgow .. ..	Leave .. ..	b.
Gerrard, J. J., M.B. ..	York .. ..	„ „ „ „	—
Hunter, G. D., D.S.O. ..	Aldershot .. ..	Medical Inspector of Recruits, Northern Command	—
Henderson, R. S. F., M.B.	Simla, India .. ..	Off. Com. Depot, R.A.M.C., Off. in charge Records, R.A.M.C., and School of Instruction, R.A.M.C.	—
Haines, H. A., M.D. ..	„ „ „ „	Sec. to P.M.O., H.M.'s Forces in India	—
Hale, G. E., D.S.O. ..	Portsmouth .. ..	Officer in charge Reception Hosp.	—
Hale, G. E., D.S.O. ..	London .. ..	Medical Inspector of Recruits, Eastern Command	—
Hickson, S., M.B. .. ..	Wynberg, S. Africa ..	Officer in charge Military Hosp. and O.C. 22nd Coy. R.A.M.C.	—
Hearn, M. L. .. ..	Dublin .. ..	„ „ „ „	—
Hall, R. H., M.D. .. ..	Colchester .. ..	Medical Inspector of Recruits ..	—

Name.	Station.	Appointment.	Specialist Certifi- cates in
Hanley, R. G., M.B.	Dublin	Officer in charge Military Hospital, Portobello	—
Hennessey, D., M.D.	Ahmednagar, India	Officer in charge Military Hospital	—
Holyoake, R.	Sheerness	" " " "	—
Johnson, C. W., M.B.	Gibraltar	" " " "	—
Jones, F. W. C., M.B.	Tidworth Park	Commandant R.A.M.C. Camp of Instruction	—
Kennedy, A.	Netley	Officer in charge " D " Block	—
Knaggs, H. T., M.D.	Alexandria, Egypt	" " Military Hospital	b.
Lilly, A. T. L.	Belgaum, India	" " " "	—
Lane, C. A., M.B.	Hounslow	" " " "	—
Lavie, T. G.	Newbridge	" " " "	—
Le Quesne, F. S., V.C.	Woolwich	" " " "	—
Magrath, C. W. S., M.D.	Hulsea	Officer in charge Military Hospital	—
Morris, W. A.	Cawnpore, India	" " " "	—
Manders, N.	Colombo, Ceylon	O.C. 26th " Coy. R.A.M.C., and Officer in charge Military Hosp.	—
Meek, J., M.D.	Quetta, India	" " " "	b.
Morris, A. E., M.D.	Kamptee, India	" " " "	—
MacLeod, R. L. R., M.B.	Karachi, India	" " " "	b.
Melville, C. H., M.B.	R.A.M. College	Professor of Hygiene	b.
MacDonald, C. J., M.D.	Fermyo	Officer in charge Military Hospital and Anaesthetist	—
Mathias, H. B., D.S.O.	Egypt	Principal Med. Officer Egyptian Army	—
Marks, G. F. H., M.D.	Ferozepore, India	Officer in charge Military Hospital	—
Nash, L. T. M.	Ranikhet, India	" " " "	—
Newland, P. R., M.B.	York	Staff Officer to P.M.O., Northern Command	—
O'Halloran, M., M.D.	Shorncliffe	" " " "	—
O'Callaghan, D. M.	Aldershot	" " " "	—
Powell, S., M.D.	Rangoon, India	Officer in charge Military Hos-pital	—
Philson, S. C.	Delhi, India	" " " "	—
Penton, R. H., D.S.O.	Poona, India	Officer in charge Military Hospital	b.
Russell, M. W.	London	Staff-Officer to P.M.O., Eastern Command	—
Rolly, C. C.	Sandhurst	Surgeon R.M. College	—
Rowan, H. D., M.B.	Alder-shot	" " " "	—
Russell, J. J., M.B.	Limerick	Officer in charge Military Hospital	—
Swabey, L. W.	Aden	Leave	—
Swan, W. T., M.B.	Netley	Officer in charge Medical Division	—
Shine, J. M. F., M.D.	Nam Tal, India	" " Military Hospital	—
Sexton, M. J., M.D.	Dublin	" " " "	—
Starr, W. H.	Shwabo, India	Officer in charge Military Hospital	—
Sutton, A. A., D.S.O.	Tower Hill, W. Africa	Senior Medical Officer	—
Salvage, J. V., M.D.	Muttra, India	Officer in charge Military Hospital	b.
Saunders, D. M., M.D.	Ballincollig	" " " "	b.
Thompson, H. N., D.S.O., M.B.	Lucknow, India	" " " "	—
Turner, W.	York	" " Mil. Hosp. and Off. Com. 8th Coy. R.A.M.C.	—
White, H. L. E.	Forrest, Malta	Officer in charge Military Hos-pital	—
Wills, S. R.	Agra, India	" " " "	—
Wilson, J. B., M.D.	Woolwich	" " " " Surgical Div., Roy. Herbert Hosp.	—
Will, J., M.B.	Kinsale	Officer in charge Military Hospital	—
Wright, R. W.	Shoeburness	" " " "	—
Windle, R. J., M.B.	Royal Hospital, Kilmain- ham, Dublin	Physician and Surgeon	—
Whaite, T. Du B., M.B.	Royal Arsenal, Woolwich	Senior Medical Officer	—
Yarr, M. T., F.R.C.S.I.	Edinburgh	Medical Inspector of Recruits, Scottish Command	k.

## MAJORS.

Name.	Station	Appointment.	Specialist Certifi- cates in
Austin, J. H. E. . . . .	London . . . . .	Recruiting duties . . . . .	—
Anderson, E. C., D.S.O. . . . .	Kuldana, India . . . . .	Officer in charge Military Hospital	—
Alexander, J. D., M.B. . . . .	Thayetmyo, India . . . . .	" " " " " " " " " "	—
Austin, R. F. E. . . . .	Jutogh, India . . . . .	" " " " " " " " " "	—
		Cantonment Hospital	
Anderson, J. B. . . . .	London . . . . .	Recruiting Duties . . . . .	c.
Archer, S. A. . . . .	Jullundur, India . . . . .	Staff Surgeon . . . . .	k.
Addams-Williams, L. . . . .	Tidworth . . . . .	" " " " " " " " " "	—
Archer, G. J. S., M.B. . . . .	Secunderabad, India . . . . .	" " " " " " " " " "	j.
Burnside, E. A. . . . .	Tidworth Park . . . . .	" " " " " " " " " "	—
Brown, E. G. . . . .	Dublin . . . . .	" " " " " " " " " "	b.
Bullen, J. W., M.D. . . . .	Wellington, India . . . . .	Officer in charge Military Hospital	b.
Blenkinsop, A. P. (Brevet Lieutenant-Colonel)	R.A.M. College, London	Asst. to Commandant . . . . .	—
Beach, T. B. . . . .	Aldershot . . . . .	" " " " " " " " " "	—
Bewley, A. W. . . . .	Landour, India . . . . .	Officer in charge Military Hospital	—
Beveridge, W. W. O., D.S.O., M.B.	London . . . . .	Medical Officer, Royal Army Clothing Department	b.
Bray, G. A. T. . . . .	Southampton . . . . .	Embarking Medical Officer . . . . .	—
Buist, H. J. M., D.S.O., M.B.	South Africa . . . . .	" " " " " " " " " "	—
Brogden, J. E. . . . .	Gibraltar . . . . .	Company Officer . . . . .	—
Begbie, F. W. . . . .	Colchester . . . . .	" " " " " " " " " "	—
Beyts, W. G. . . . .	St. John's Wood . . . . .	Officer in charge Military Hospital	—
Buchanan, G. J., M.B. . . . .	Chaubuttia, India . . . . .	" " " " " " " " " "	—
Bray, H. A. . . . .	Woolwich . . . . .	" " " " " " " " " "	—
Buswell, F. R. . . . .	London . . . . .	Recruiting Duties . . . . .	—
Berryman, H. A. . . . .	Chester . . . . .	Company Officer . . . . .	o.
Barnett, K. B., M.B., F.R.C.S.I.	Lydd . . . . .	" " " " " " " " " "	m.
Boyle, M., M.B. . . . .	Leeds . . . . .	Officer in charge Military Hospital	o.
Buist, John M., M.B. . . . .	Netley . . . . .	" " " " " " " " " "	b.c.p.
Blackham, R. J. . . . .	Cherat, India . . . . .	San. Offr., 1st Peshawar Division	b. h.
Birrell, E. T. F., M.B. . . . .	War Office, London . . . . .	Headquarter Staff . . . . .	k.
Bliss, E. W. . . . .	Mhow, India . . . . .	Specialist in Operative Surgery, Officer in charge Section Hosp., Consulting Surg. R. M. Railway	j.
Brodribb, E. . . . .	Hythe . . . . .	Officer in charge Military Hospital, and Specialist in Laryngology	k.
Bowen, A. W. N. . . . .	Poona, India . . . . .	" " " " " " " " " "	—
Brown-Mason, H. O. B. . . . .	" " " " " " " " " "	" " " " " " " " " "	e.
Bourke, E. A. . . . .	Cape Town, S. Africa . . . . .	Embarkation Medical Officer . . . . .	b. f.
Barrow, H. P. W. . . . .	Liverpool . . . . .	Adjutant West Lancashire Divi- sion R.A.M.C.T.	b.c.p.
Clark, S. F., M.B. . . . .	Mantzburg, S. Africa . . . . .	Officer in charge Military Hospital	b.
Copeland, R. J., M.B. . . . .	Darjeeling, India . . . . .	" " " " " " " " " "	—
Connor, J. C., M.B. . . . .	Bangalore, India . . . . .	" " " " " " " " " "	—
Crawford, G. S., M.D. . . . .	Malta . . . . .	Sanitary Officer . . . . .	b. p.
Condon, E. H., M.B. . . . .	Cardiff . . . . .	Officer in charge Military Hospital	—
Chambers, A. J. . . . .	Protoria, S. Africa . . . . .	Staff Officer to P.M.O., S. Africa	—
Collins, D. J., M.D. . . . .	Dublin . . . . .	Specialist in Ophthalmology . . . . .	k. b.
Clark, E. S., M.B. . . . .	Ballyknier Camp . . . . .	Officer in charge Troops . . . . .	f.
Cameron, K. M., M.B. . . . .	Simla, India . . . . .	Staff Surgeon in charge Army Headquarters Staff and Estab- lishments	j.
Carter, J. E., M.B. . . . .	Landguard Fort . . . . .	" " " " " " " " " "	f. b.
Campbell, J. H., D.S.O. . . . .	Curepipe, Mauritius . . . . .	Officer in charge Mil. Families' Hospital	h.
Cochrane, E. W. W., M.B. . . . .	Prospect, Bermuda . . . . .	Sanitary Officer . . . . .	b. c.
Clements, R. W., M.B. . . . .	Wellington, India . . . . .	Sanitary Officer, 9th Division . . . . .	o. b. p.
Corkery, M. P. . . . .	Mount Abu, India . . . . .	Officer in charge Military Hospital and in Medical charge, Lawrence School, and Residency Surgeon	a.

Name.	Station.	Appointment.	Specialist Certifi- cates in
Clarke, T. H. M., C.M.G., D.S.O., M.B.	Salisbury .. ..	Medical Inspector of Recruits, Southern Command	—
Cummins, S. L., M.B.	R.A.M. College .. ..	.. .. .	c. p.
Carroll, F. F., M.B.	Egyptian Army .. ..	.. .. .	j.
Carter, G. B., M.B.	Dublin .. ..	.. .. .	—
Collingwood, P. H.	Crownhill .. ..	.. .. .	—
Cowan, J., M.B.	Woolwich .. ..	Clinical Pathologist .. ..	c.
Crisp, G. B.	Mhow, India .. ..	Staff Officer for Mobilisation Stores	—
Dalton, C. ..	Dublin .. ..	Staff Officer to P.M.O., I.C.	—
Dunn, H. N., M.B.	Dagshai, India .. ..	Officer in charge Military and Can- tonment Hospital	—
Dansey-Browning, G.	Aldershot .. ..	Assistant Sanitary Officer	b. p.
Elliott, O. R., M.D.	Dalhousie, India .. ..	Sanitary Officer, 3rd Division	b.
Erakine, W. D., M.B.	York .. ..	Company Officer .. ..	—
Evans, P., M.B.	Devonport .. ..	Specialist in Operative Surgery	b. f. j.
Forde, B., M.B.	Wynberg, S. Africa	Company Officer .. ..	b.
Ferguson, J. D., D.S.O.	London .. ..	Recruiting Duties .. ..	—
Faichnie, N., M.B.	Mhow, India .. ..	Divisional Sanitary Officer	b. p.
Fleming, C. C., D.S.O., M.B.	Aldershot .. ..	Instructor R.A.M.C. School of Instruction	—
Faichnie, F. G.	London .. ..	Officer in charge Chelsea Barracks	—
Fowler, C. E. P., F.R.C.S. Eng.	Gibraltar .. ..	Sanitary Officer .. ..	k. b.
French, H. C.	Imtarfa, Malta .. ..	.. .. .	c. b.
Fleury, C. M.	Tidworth .. ..	.. .. .	o.
Fox, A. C.	Tientsin, N. China	Senior Medical Officer and O.C. R.A.M.C.	h.
Fairrie, S. H., M.B.	Shorncliffe .. ..	Officer in charge "Helena" Hosp.	h.
Forrest, J. V., M.B.	Cairo .. ..	Company Officer .. ..	—
Fuhr, R. S. H., D.S.O.	Woolwich .. ..	Off. in charge Mil. Families' Hosp.	h.
Gray, W. L., M.B.	Winchester .. ..	Officer in charge Military Hospital	b.
Girvin, J. ..	Deolali, India .. ..	" " " "	—
Graham, W. A. S. J.	Nowgong, India .. ..	" " " "	—
Gibbard, T. W., M.B.	London .. ..	" " Military Hospital, Rochester Row	k.
Goodwin, T. H. J. C., D.S.O.	Quetta, India .. ..	Specialist in Operative Surgery	j. o.
Green, S. F. St. D., M.B.	Aldershot .. ..	Officer in charge Louise Margaret Hospital	h.
Grattan, H. W.	Naini Tal, India .. ..	Sanitary Officer 8th Division	b. c.
Grech, J.	Warrington .. ..	Officer in charge Military Hospital	o.
Gunter, F. E., M.B.	Lucknow, India .. ..	Specialist in Operative Surgery	j.
Gwynn, W. P.	Quetta, India .. ..	.. .. .	—
Gallie, J. S.	Ahmednagar, India .. ..	.. .. .	—
Goddard, G. H.	Alderney .. ..	Officer in charge Military Hospital	h.
Hall, R. J. D.	Up Park Camp, Jamaica	Officer in charge Military Hospital	—
Horrocks, W. H., M.B.	London .. ..	Expert in Sanitation, Army Medi- cal Advisory Board	b.
Hale, C. H., D.S.O.	Strensall .. ..	Officer in charge Military Hospital	—
Holt, M. P. C., D.S.O.	Kasauli, India .. ..	In charge Cantonment Hospital	j.
Hassard, E. M.	Lahore Cantonment, India	.. .. .	—
Hallaran, W., M.B.	London .. ..	Recruiting Duties .. ..	—
Healey, C. W. R.	Nasirabad, India .. ..	Officer in charge Military Hospital	—
Hardy, F. W., M.B.	Colchester .. ..	Sanitary Officer, area North of Thames, Eastern Command	b.
Healy, C. J., M.B.	Fermoy .. ..	.. .. .	—
Hardy, W. E.	Wynberg, S. Africa	Anæsthetist .. ..	—
Hennessey, J., M.B.	Poonamallee, India .. ..	Officer in charge Military Hospital	—
Hinge, H. A.	Ootacamund, India .. ..	Staff Officer Divisional Medical Mobilisation Stores, 9th Divi- sion	—
Harrison, W. S., M.B.	R.A.M. College .. ..	Professor of Tropical Medicine	c.
Howell, H. A. L.	Gibraltar .. ..	.. .. .	f.

Name.	Station.	Appointment.	Specialist Certifi- cates in
Hayes, E. C. .. ..	Gosham .. ..	Sanitary Officer, Portsmouth Dist.	b. k.
Hooper, A. W., D.S.O. ..	Shorncliffe .. ..	.. ..	..
Hewetson, H. .. ..	Mill Hill .. ..	Officer in charge Military Hospital	a. b.
Hudleston, W. E. .. ..	Golden Hill .. ..	.. ..	b. f.
Harvey, D., M.B. .. ..	Naini Tal, India ..	Specialist in "Prevention of Disease"	a.
Hall, S. O. .. ..	Fernoy .. ..	Offi. in charge Mil. Families' Hos.	h.
Heffernan, F. J. C., F.R.C.S.I.	Lucknow, India ..	.. ..	—
Herrick, H. .. ..	Karachi, India ..	Specialist in Dermatology ..	—
Hewitt, E. P. .. ..	Secunderabad, India ..	.. ..	—
Inniss, B. J. .. ..	Gravesend .. ..	Officer in charge Military Hospital	—
Inkson, E. T., V.C. .. ..	Bangalore, India ..	Specialist in Dermatology ..	—
Julian, O. R. A., C.M.G. (Brevet-Lieut.-Colonel)	Kasauli, India .. ..	Officer in charge Military Hospital and Civil Surgeon	b.
Jennings, J. W., D.S.O.	Trawsfynydd .. ..	Officer in charge Military Hospital	o.
Jameson, J. C., M.B. ..	Khartoum, Egypt ..	.. ..	b.
Johnson, H. P., M.R.C.P. Lond.	Bloemfontein, S. Africa ..	Officer in charge Military Hospital, O.C. 24th Coy. R.A.M.C.	—
Jones, T. P., M.B. .. ..	Woolwich .. ..	Registrar, Royal Herbert Hospital and O.C. 12th and 34th Coys. R.A.M.C.	..
Kelly, J. F. M., M.B. ..	Potchefstroom, S. Africa ..	.. ..	—
Keble, A. E. O. .. ..	Gibraltar .. ..	Officer in charge Garrison Disp. Staff and Departments	h. b.
Kiddle, F., M.B. .. ..	Royal Hospital, Chelsea ..	Deputy Surgeon .. ..	k.
Killery, St. J. B. .. ..	Elizabeth Castle, Jersey ..	Officer in charge Military Hospital	—
Leishman, Sir W. B., Knt., F.R.S., M.B. (Brevet- Lieut.-Col.)	R.A.M. College, London ..	Professor of Pathology .. ..	—
Luther, A. J. .. ..	Cahir .. ..	Officer in charge Military Hospital	—
Leuehan, T. J., M.B. ..	Seaforth .. ..	.. ..	—
Lawson, C.B., M.B. ..	Netley .. ..	" " " Surgical Division	o. j.
Lewis, R. C. .. ..	Pembroke Dock .. ..	.. ..	—
Longhurst, B. W. .. ..	Warley .. ..	Leave .. ..	d.
Lawson, D. .. ..	Netley .. ..	Officer in charge Venereal Division	—
Lowsley, M. M. .. ..	Ambala, India .. ..	Staff Surgeon .. ..	b.
Morgan, F. J. .. ..	Barrackpore, India ..	Officer in charge Military Hospital	—
McCulloch, T., M.B. ..	Mandalay, India ..	.. ..	—
Macdonald, S., M.B. ..	Kowloon, China ..	" " " " " "	—
Morgan, J. C. .. ..	Dublin .. ..	Sanitary Officer .. ..	b.
Moore, S. G. .. ..	Aldershot .. ..	Sec. to P.M.O., A.C. .. ..	b.
Mould, W. T. .. ..	Dover .. ..	Officer in charge Military Hospital	—
McLoughlin, G. S., D.S.O., M.B.	Chester .. ..	Medical Inspector of Recruits, Western Command	—
Mawhinny, R. J. W. ..	Athlone .. ..	Officer in charge Military Hospital	—
MacCarthy, I. A. O. ..	Tanglin, Straits Setts. ..	" " " Military Hospital and Officer Commanding 32nd Coy. R.A.M.C.	—
Morphew, E. M. .. ..	Roorkee, India .. ..	Officer in charge Military Hospital	—
Mitchell, L. A., M.B. ..	Woking .. ..	.. ..	—
Martin, C. B., M.B. ..	Netley .. ..	" " " " " "	—
McNaught, J. G., M.D. ..	Cape Town, S. Africa ..	.. ..	—
McDermott, T., M.B. ..	Woolwich .. ..	Specialist in Ophthalmology ..	b.
More, L. P., M.B. .. ..	Murree, India .. ..	Staff Officer Medical Mobilisation Stores, 2nd Division	k.
Moore, G. A., M.D. .. ..	Woolwich .. ..	Med. Off. R.M. Academy, Specialist in Laryngology	g.
Marder, N. .. ..	Gosham .. ..	.. ..	—
Mansfield, G. S., M.B.	Norwich .. ..	Officer in charge Military Hospital	—
Mangin, F. M. .. ..	Aldershot .. ..	Specialist in Ophthalmology ..	k.
McNunn, J. R. .. ..	Netley .. ..	Registrar and Adjutant .. ..	f.
Master, A. E., M.B. ..	Royal Arsenal, Woolwich ..	.. ..	—
Morgan, C. K., M.B. ..	Dundalk .. ..	Officer in charge Military Hospital	g. o.

Name.	Station.	Appointment.	Specialist Certifi- cates in
Milner, A. E. .. ..	Tidworth Park .. ..	.. .. .	o
Maurice, G. T. K. .. ..	Bulford .. ..	.. .. .	m.
Morris, A. H. .. ..	Edinburgh.. ..	Sanitary Officer .. ..	b. c.
MacDougall, A. J., M.B. ..	Diyatalawa, Ceylon ..	Sanitary Officer and Officer in charge Military Hospital	c.
Marriott, E. W. P. V. ..	Gibraltar .. ..	.. .. .	o.
McKessack, P., M.B. ..	Vacoas, Mauritius ..	Officer in charge N.D. Hospital, Sanitary Officer	b. c.
McCarthy, J. McD., M.B.	Chapel Bay .. ..	Officer in charge Military Hospital	a. b. p.
Martin, H. G. .. ..	Lebong, India .. ..	" " .. ..	h.
Macpherson, J. D. G., M.B.	Pachmarhi, India ..	" " Military and "Can- tonment Hospital, Specialist in Operative Surgery	—
Mainprise, C. W. .. ..	Rawalpindi, India ..	.. .. .	—
Norrington, H. L. W. ..	Chatham .. ..	Officer in charge Mil. Families' Hospital	h.
Nickerson, W. H. S., V.C., M.B. .. ..	York .. ..	Sanitary Offi. Northern Command	b. c.
O'Reilly, H. W. H., M.B.	Colchester .. ..	.. .. .	—
O'Grady, S. de C., M.B. ..	Cairo, Egypt .. ..	.. .. .	a.
O'Gorman, C. J., D.S.O.	Peshawar, India ..	.. .. .	—
O'Flaherty, A. R. .. ..	Devonport .. ..	Company Officer and Anaesthetist	—
Poole, W. C., M.B. .. ..	Rawalpindi, India ..	.. .. .	b.
Pocock, H. I. .. ..	Nowshera India ..	Officer in charge Military Hospital	d.
Powell, E. E. .. ..	Bordon .. ..	" " Reception Sta- tion, Longmoor	—
Pearse, A. .. ..	Chatham .. ..	Company Officer .. ..	b. p.
Porter, F. J. W., D.S.O.	.. ..	Leave .. ..	—
Pilcher, E. M., D.S.O., M.B., F.R.C.S.Eng.	R.A.M. College ..	Professor of Military Surgery	j.
Pollock, C. E. .. ..	War Office, London ..	Headquarter Staff .. ..	e. o.
Prynne, H. V. .. ..	Gibraltar .. ..	.. .. .	k.
Profeit, C. W., M.B. ..	London .. ..	.. .. .	g.
Perry, S. J. C. P. .. ..	Dover .. ..	.. .. .	o.
Probyn, P. J., D.S.O., M.B. .. ..	Victoria, S. China ..	Sanitary Officer, Company Officer	b.
Poe, J. M. B. .. ..	Bloemfontein, S. Africa ..	Offi. in charge Mil. Families' Hosp.	—
Penny, F. S., M.B. ..	Chatham .. ..	" " Casualty Hospital	a. b.
Parker, L. E. J. .. ..	Poona, India .. ..	Sanitary Officer 6th Division ..	c. b.
Ritchie, J., M.B. .. ..	Multan, India .. ..	Offi. in charge Casualty Hospital	—
Rawnsley, G. T. .. ..	Aldershot .. ..	.. .. .	—
Reilly, C. W. .. ..	Dum Dum, India ..	Officer in charge Military Hospital, Civil Surgeon	b.
Robinson, O. L. .. ..	Kailana, India .. ..	Officer in charge Military Hospital	b.
Read, H. W. K. .. ..	Pontefract .. ..	.. .. .	—
Rivers, J. H. .. ..	Woolwich .. ..	Sick leave .. ..	o.
Riddick, G. B. .. ..	Maymyo, India .. ..	.. .. .	—
Rattray, M. MacG., M.B.	Brighton .. ..	Officer in charge Military Hospital	—
Ross, N. H., M.B. .. ..	Aldershot .. ..	Officer Commanding "A" Coy., Depôt, R.A.M.C.	—
Scott, B. H. .. ..	War Office, London ..	Headquarter Staff .. ..	b.
Stone, C. A., M.D. .. ..	Bellary, India .. ..	Officer in charge Military Hospital	—
Smith, F., D.S.O. .. ..	Murree, India .. ..	Sanitary Officer, 2nd Division ..	b.
Smithson, A. E., M.B. ..	Harrismith, S. Africa ..	Leave .. ..	b. p.
Shanahan, D. D. .. ..	Secunderabad, India ..	.. .. .	—
Stalkartt, C. E. G., M.D.	Gosport .. ..	Officer in charge Military Hospital	—
Stanistreet, G. B., M.B. ..	Salisbury .. ..	Staff Officer to Principal Medical Officer, Southern Command	—
Slayter, E. W., M.B. ..	Wellington, India ..	.. .. .	—
Symons, F. A., M.B. ..	Newara Eliya, Ceylon ..	Officer in charge Military Hospital	—
Samman, C. T. .. ..	Dinapur, India ..	" " " " .. ..	n. b.
Spencer, C. G., M.B., F.R.C.S.Eng.	London .. ..	.. .. .	j.

Name.	Station.	Appointment.	Specialist Certifi- cates in
Silver, J. P., M.B.	Edinburgh		—
Sweetnam, S. W.	Kirkee, India	Officer in charge Military Hospital	—
Steel, E. B., M.B.	Neemuch, India	Military Hospital, Specialist in Mental Science	n.
Staddon, H. E.	Curragh		—
Smith, L. F., M.B.	Nowshera, India	Off. in charge Brigade Laboratory	f. b.
Statham, J. C. B.	Pretoria, S. Africa	Bacteriologist	b. c. p.
Swabey, M.	Jubbulpore, India		m.
Stammers, G. E. F.	Tidworth	Sanitary Officer, Tidworth District	a. b.
Stallard, H. G. F.	Aldershot	Officer Commanding "C" Com- pany, Dépôt, R A M.C.	—
Selby, R. M. B.	Meerut, India	Staff Surgeon, in charge Cavalry Followers' Hospital, Specialist in Dermatology	e.
Scott, A. L.	Aldershot		c.
Thurston, H. C., C.M.G.	St. George's, Bermuda	Officer in charge Military Hospital	—
Thomson, J., M.B.	Harrismith, South Africa		—
Tate, G. W., M.B.	Dublin	Recruiting Medical Officer	b. p.
Tyacke, N.	Devonport		—
Thurston, H. S.	Millbank, London	Coy. Officer	—
Thompson, A. G., M.B.	Ferozepore, India		b.
Taylor, W. J., M.B.	Hollywood	Officer in charge Military Hospital	b. o.
Tyrrrell, A. F.	Kilworth Camp	" " N.D.	—
Tibbits, W., M.B.	Chatham		—
Thom, G. St. C., M.B.	Sabathu, India	Officer in charge Military and Cantonment Hospital	l. g.
Thorp, A. E.	Bulford		—
Watson, J. J. C., C.I.E., M.D., F.R.C.S. Edin.	Portsmouth		—
Winter, H. E.	Gravesend		—
Way, L.	Coshain	Company Officer	—
Williams, E. McK.	Sheffield	Officer in charge Military Hospital	—
Whitstone, C. W. H., M.B.	Cherat, India	Staff Officer for Medical Mobilisa- tion Store, 1st Peshawar Division	—
Wade-Brown, F. J.	Cork		—
Withers, S. H., M.B.	Gharial, India	Officer in charge Military Hospital	—
Williams, E. M.	Calcutta, India	Specialist in Midwifery and Diseases of Women and Children	h.
Waring, A. H.	Secunderabad, India	Specialist in Electrical Science	o.
Ward, W. A.	Bulford		e.
Wanhill, C. F.	R.A.M. College	Assistant Professor Hygiene	b. c.
Watts, B.	Campbellpore, India	Officer in charge Military and Cantonment Hospital	b. h.
Weld, A. E.	Valletta, Malta	Off. in charge Mil Families' Hosp.	h.
Walton, H. B. G.	Whitley Bay	Officer in charge Military Hospital	b. c.
Young, C. A.	Curepipe, Mauritius	" " Military Hospital and Officer Commanding 31st Coy. R.A.M.C.	—
Young, A. H. O.	Halifax	Officer in charge Military Hospital	—

## CAPTAINS.

Ashe, F.	Colchester	Specialist in Midwifery	h.
Anderson, H. S.	Buttevant	Officer in charge Military Hospital	—
Adye-Curran, W. J. P.	Cosham	Specialist in Operative Surgery	j.
Argles, R. L.	Solon, India	Officer in charge Military and Cantonment Hospital	—
Adderley, A. C.	Lichfield		—
Aylen, E. V.	Kirkee, India	Specialist in Dermatology	e.
Adye-Curran, S. M.	Queenstown		b.
Ainsworth, R. B.	Tidworth		b. c.
Ahern, D.	Cork		b. c.

Name.	Station.	Appointment	Specialist Certifi- cates in
Anderson, R. G. ..	Egyptian Army ..	.. .. .	—
Ahern, M. D. ..	Queenstown ..	.. .. .	—
Arthur, A. S., M.B. ..	Stobs and Hawick ..	Officer in charge Field Hospital ..	—
Anderson, J. A., M.B. ..	Bloemfontein, S. Africa ..	.. .. .	p.
Anthonsiz, E. G. ..	Bangalore, India ..	.. .. .	—
Archibald, R. G., M.B. ..	Egyptian Army ..	.. .. .	—
Amy, A. C., M.B. ..	Banikhet, India ..	.. .. .	—
Avis, W. G. ..	Karachi, India ..	.. .. .	—
Andrews, L. A. A. ..	Curepipe, Mauritius ..	.. .. .	—
Brakenbridge, F. J. ..	Dover ..	.. .. .	b.
Blackwell, W. R. ..	Lucknow, India ..	Staff Surgeon ..	—
Butler, S. G. ..	Pretoria, S. Africa ..	Leave ..	j.
Bond, J. H. R. ..	Mhow, India ..	.. .. .	—
Babington, M. H. ..	Cottonera, Malta ..	Clinical Pathologist ..	c.
Baker, W. L. ..	" ..	Specialist in Ophthalmology ..	k.
Bennett, W., M.B. ..	Calcutta, India ..	Offi. in charge Brigade Laboratory, Spec. in Prevention of Disease	a
Biggam, T., M.B. ..	Aldershot ..	.. .. .	—
Barlett, B. S. ..	Colchester ..	Company Officer ..	—
Bennett, E. ..	Derby ..	Adjutant, North Midland Division R.A.M.C.T.	—
Brown, R. T., M.D. ..	Maymyo, India ..	Divisional Sanitary Officer ..	b. c.
Bennett, W. L., M.B., F.R.C.S.,Edin.	Bermuda ..	.. .. .	—
Burke, B. B. ..	West Africa ..	.. .. .	l.
Baillie, G., M.B. ..	Port Lokkoh, W. Africa ..	Offi. in Charge Military Hospital ..	—
Black, R. B., M.B. ..	Egyptian Army ..	.. .. .	—
Brunskill, J. H., M.B. ..	Aldershot ..	.. .. .	—
Bateman, H. R. ..	London ..	Sleeping Sickness Commission ..	c.
Bransbury, H. A. ..	Woolwich ..	Specialist in Dermatology ..	e.
Barbour, J. H., M.B. ..	Jubbulpore, India ..	Offi. in charge Gun Carriage Fact. ..	—
Bostock, J. S., M.B. ..	Aldershot ..	Company Officer Nos. 1 and 3 Coy. R.A.M.C.	—
Beatty, M. C., M.B. ..	Devonport ..	.. .. .	b.
Balck, C. A. J. A., M.B. ..	Dublin ..	.. .. .	r.
Bagshawe, H. V. ..	Leicester ..	.. .. .	a.
Browne, W. W. ..	Colchester ..	.. .. .	b. r.
Bell, J. G., M.B. ..	Liverpool ..	.. .. .	—
Bridges, R. H. ..	Aldershot ..	.. .. .	—
Brown, G. H. J., M.B. ..	Delhi, India ..	.. .. .	—
Bramhall, C. ..	Lichfield ..	.. .. .	—
Bousfield, L., M.D. ..	Southern Command ..	.. .. .	—
Bowle, S. C. ..	Deolali, India ..	Officer in charge Cantonment Hosp. ..	d.
Byam, W. ..	Egyptian Army ..	.. .. .	—
Beadnell, H. O. M. ..	Lahore Cantonment, India ..	Leave ..	—
Buchanan, R. J. B. ..	Cosham ..	Anæsthetist ..	b.
Booth, E. B., M.D. ..	Kamptee, India ..	.. .. .	—
Brown, C. G. ..	Lucknow, India ..	Specialist in Dermatology, 8th Division	—
Benson, W., M.B. ..	Rawalpindi, India ..	Officer in charge Cantonment Hosp. ..	—
Bryden, R. A. ..	Bloemfontein, S. Africa ..	.. .. .	—
Blackwell, T. S. ..	Bhamo, India ..	.. .. .	—
Bond, A. H. ..	Naini Tal, India ..	.. .. .	—
Boyce, W. W. ..	Lahore Cantonment, India ..	.. .. .	—
Benett, A. M. ..	Jubbulpore, India ..	Staff Surgeon ..	—
Bracken, G. P. A. ..	Secunderabad, India ..	.. .. .	—
Bennett, J. A., M.B. ..	Indore, India ..	Offi. in charge Section Hospital ..	—
Bell, W. J. E., M.B. ..	Victoria, Hong Kong ..	.. .. .	—
Bowle, C. W. ..	Forozepore, India ..	.. .. .	—
Browne, W. T. ..	Kamptee, India ..	Offi. in charge Cantonment Hosp. ..	—
Bradish, F. L. ..	Jullundur, India ..	.. .. .	—
Beaman, W. K. ..	Imtarfa, Malta ..	.. .. .	—
Boyd, J. E. M. ..	Dalhousie, India ..	.. .. .	—

Name.	Station.	Appointment.	Specialist Certifi- cates in
Curme, D. E. .. ..	Ewshot .. ..	Offi. in charge Detention Hospital	—
Cunningham, R. A., M.B.	Agra, India .. ..		b.
Crawford, V. J. .. ..	Portsmouth .. ..	Offi. in charge Mil. Families' Hosp.	h.
Chopping, A. .. ..	Peshawar, India .. ..	Specialist in X-rays .. ..	—
Connolly, E. P. .. ..	Cardiff .. ..	Adjutant, Welsh Div. R.A.M.C.T.	—
Cumming, C. C., M.B.	R.A.M. College .. ..		c.
Carylon, A. F. .. ..	.. ..	Leave .. ..	—
Croly, W. C. .. ..	Colchester .. ..		—
Cotton, F. W. .. ..	Barrow-in-Furness .. ..	Officer in charge Military Hospital	—
Carroll, G. .. ..	Potchefstroom, South Africa .. ..		—
Churton, J. G. .. ..	Peshawar, India .. ..	Specialist in Operative Surgery, Staff Surgeon	j.
Cuthbert, J. M., M.B.	.. ..	Leave .. ..	c.
Carr, C. H., M.D.	Tidworth .. ..	Specialist in Dental Surgery .. ..	d.
Crosthwait, W. S. .. ..	Cahir .. ..		—
Cowey, R. V. .. ..	Tidworth .. ..	Offi. in charge Mil. Families' Hosp.	h.
Clarke, J. B., M.B.	Wilberforce, West Africa .. ..	„ „ Military Hospital .. ..	j.
Cotterill, L. .. ..	Aldershot .. ..		a.
Craig, B. A. .. ..	Victoria, S. China .. ..		—
Crossley, H. J. .. ..	York .. ..		—
Clarke, F. A. H. .. ..	Edinburgh .. ..		a.
Conway, J. M. H., F.R.C.S.I.	Dublin .. ..		—
Coates, T. S., M.B.	Cork .. ..		—
Carmichael, J. C. G., M.B.	Fleetwood .. ..	Officer in charge Military Hospital	—
Carmichael, D. G., M.B.	Newport .. ..		—
Crawford, J. M. M.	Woolwich .. ..	„ „ „ „ .. ..	—
Collins, R. T. .. ..	Woolwich .. ..		—
Cathcart, G. E. .. ..	Rhayader .. ..	Officer in charge Military Hospital	—
Cahill, R. J., M.B.	Madras, India .. ..	„ „ Brigade Lab., Spec- ialist in Prevention of Disease	—
Connell, H. B. .. ..	Wonkufu, W. Africa .. ..	Officer in charge Military Hospital	—
Campbell, J. H., M.B.	Allahabad, India .. ..	„ „ Brigade Lab. .. ..	b.
		Spec. in Prevention of Disease	—
Cordner, R. H. L. .. ..	Rawalpindi, India .. ..	Offi. in charge Mil. Families' Hosp.	—
Carter, H. St. M., M.D.	Cottonera, Malta .. ..	Company Officer .. ..	—
Churchill, G. B. F. .. ..	Meiktila, India .. ..	Officer in charge Military Hospital	—
Cromie, M. J. .. ..	Delhi, India .. ..	Leave .. ..	—
Cummins, A. G., M.B.	Egyptian Army .. ..		—
Corbett, D. M., M.B.	Ambala, India .. ..		—
Caddell, E. D., M.B.	.. ..		—
Countts, D., M.B. .. ..	Allahabad, India .. ..		—
Cassidy, C. .. ..	Egyptian Army .. ..		—
Chapman, F. H. M. .. ..	Darjeeling, India .. ..		—
Casement, F., M.B.	Lucknow, India .. ..		—
Carruthers, V. T., M.B., F.R.C.S.Edin.	Kandy, Ceylon .. ..	Officer in charge Military Hospital	—
Cooke, O. C. P. .. ..	Colaba, India .. ..		—
Delap, G. G., D.S.O.	Aldershot .. ..	Assist. Inst., R.A.M.C. School of Instruction, and O.C. "B" Coy., Depôt, R.A.M.C.	—
Douglas, H. E. M., V.C., D.S.O.	Woolwich .. ..		b.
Dennis, B. R., M.B.	Tanglin, Straits Settlements .. ..	Bacteriologist and Sanitary Officer	c.
Dorgan, J., M.B. .. ..	Cork .. ..	Sanitary Officer .. ..	a. b. p.
Douglass, P. C. .. ..	Weedon .. ..	Officer in charge Military Hospital	—
Duffey, A. C., M.D.	Dublin .. ..		h.
Davidson, H. A., M.B.	Curragh .. ..		b.
Davis, W. .. ..	Barilly, India .. ..		—
Davidson, P., D.S.O., M.B.	Netley .. ..		—
Dawson, F. W. W., M.B.	Belfast .. ..		—
Dunbar, B. H. V., M.D.	Richmond .. ..	Officer in charge Military Hospital	—
Duguid, J. H., M.B.	Cork .. ..		l.

Name.	Station.	Appointment.	Specialist Certi- ficates in
Dudding, T. S. . . . .	Bury . . . . .	Officer in charge Military Hospital	—
Dunkerton, N. E. . . . .	Woolwich . . . . .	.. .. .	—
Douglas, J. H., M.D. . . . .	Dublin . . . . .	.. .. .	b.
Dwyer, P., M.B. . . . .	Aden . . . . .	Specialist in Prevention of Disease	—
Davy, P. C. T., M.B. . . . .	Nowgong, India . . . . .	.. .. .	—
Doig, K. A. C. . . . .	Muttra, India . . . . .	.. .. .	—
Dunn, J. S., F.R.C.S.I. . . . .	Agra, India . . . . .	Leave .. .. .	—
Drew, C. M., M.B. . . . .	Egyptian Army . . . . .	.. .. .	—
De la Cour, G., M.B., B.S. . . . .	Bangalore, India . . . . .	Specialist in Operative Surgery ..	—
Dawson, A., M.B. . . . .	Wellington, India.. . . .	.. .. . Dermatology ..	—
Dill, M. G., M.D. . . . .	Maidstone . . . . .	Officer in charge Military Hospital	—
Denyer, C. H. . . . .	Jubbulpore, India . . . . .	Specialist in Dermatology and in charge Brigade Laboratory	—
Ellery, E. E. . . . .	Egypt . . . . .	Specialist in Operative Surgery ..	j.
Elsner, O. W. A. . . . .	Pretoria, S. Africa . . . . .	.. .. .	b.
Ensor, H., D.S.O., M.B. . . . .	Egyptian Army . . . . .	.. .. .	c.
Evans, C. R. . . . .	Strensall . . . . .	.. .. .	—
Ellery, R. F. . . . .	Benares, India . . . . .	Officer in charge Military Hospital	—
Ellis, W. F. . . . .	Lahore Cantonment, India . . . . .	.. .. .	—
Easton, P. G. . . . .	Aldershot . . . . .	.. .. .	h.
Emerson, H. H. A., M.B. . . . .	Canterbury . . . . .	.. .. .	—
Egan, W., M.B. . . . .	Multan, India . . . . .	.. .. .	—
Edmunds, C. T. . . . .	Peshawar, India . . . . .	.. .. .	—
Edwards, G. B. . . . .	Port Louis, Mauritius . . . . .	Officer in charge Military Hospital	—
Elliott, F. J., M.B. . . . .	Shon-heie-Kwan, N. China . . . . .	.. .. . N.D. ..	—
Elliott, A. C., M.B. . . . .	Kalahagh, India . . . . .	Officer in charge Military and Section Hospital	—
Fell, M. H. G. . . . .	Cairo, Egypt . . . . .	.. .. .	b. p.
Falkner, P. H., F.R.C.S.I. . . . .	Watford, Bermuda . . . . .	Officer in charge Military Hospital	—
Foster, J. G., M.B. . . . .	Curragh . . . . .	Company Officer .. .. .	—
Ford, E. G., M.B. . . . .	Rawalpindi, India . . . . .	.. .. .	—
Fawcus, H. B., M.B. . . . .	Bloemfontein, S. Africa . . . . .	Officer in charge Laboratory ..	a. h.
Fielding, T. E., M.B. . . . .	Woolwich . . . . .	Adjutant, 2nd (London) Division R.A.M.C.T.	c.
Furnivall, C. H. . . . .	York . . . . .	.. .. .	—
Fitzgerald, Fitz G. G. . . . .	Dover . . . . .	In Medical charge Duke of York's School	—
Fry, W. B. . . . .	Egyptian Army . . . . .	.. .. .	c.
Fleming, C. E., M.B. . . . .	Woolwich . . . . .	Leave .. .. .	k.
Fawcett, R. F. M. . . . .	Gosport . . . . .	.. .. .	—
Falkner, M. W., F.R.C.S.I. . . . .	Curragh . . . . .	Specialist in Operative Surgery ..	j.
Foulds, M. F. . . . .	Belfast . . . . .	.. .. .	j.
French, E. G., M.D., F.R.C.S.E. . . . .	Edinburgh . . . . .	.. .. .	—
Foster, R. L. V., M.B. . . . .	Fethard . . . . .	Officer in charge of Non-Dieted Hospital	—
Franklin, R. J. . . . .	Cork . . . . .	.. .. .	—
Fawcett, H. H. J. . . . .	Mudford Camp . . . . .	.. .. .	—
Fairbairn, J., M.B. . . . .	Glasgow . . . . .	.. .. .	—
Fraser, A. N., M.B. . . . .	.. .. .	Adjutant, Lowland Div. R.A. M.C.T.	—
Frost, A. T., M.B. . . . .	Dublin . . . . .	.. .. .	e.
Ferguson, G. E. . . . .	Cyprus . . . . .	Officer in charge Military Hospital	—
Fawcett, C. E. W. S., M.B. . . . .	Shwebo, India . . . . .	.. .. .	—
Farrant, P. . . . .	Birmingham . . . . .	.. .. .	—
Forrest, F. . . . .	Ambala, India . . . . .	.. .. .	—
Forsyth, W. H., M.D. . . . .	Middelburg, S. Africa . . . . .	Officer in charge N. D. Hospital..	—
Foster, J. R. . . . .	Mhow, India . . . . .	.. .. . Followers' Hos- pital, Staff Surgeon	—
Fraser, A. D., M.B. . . . .	.. .. .	Seconded under Colonial Office ..	—
Fortescue, A., M.B. . . . .	Cawnpore, India . . . . .	Officer in charge Harness and Saddle Factory	—
Field, S. . . . .	Chatham . . . . .	.. .. .	—
Farebrother, H. W. . . . .	Malappuram, India . . . . .	Officer in charge Military Hospital	—

Name	Station.	Appointment.	Specialist Certifi- cates in
Gill, J. G. . . . .	Cherat, India . . . .	Officer in charge Military Hospital, Staff Surgeon, Specialist in Oph- thalmology	—
Goldsmith, G. M., M.B. .	Maymyo, India . . . .	Staff Surgeon . . . . .	—
Greenwood, A. R. . . .	Aldershot . . . . .	Specialist in Operative Surgery, Connaught Hospital	j.
Goodwin, W. R. P. . . .	Royal Arsenal, Woolwich	. . . . .	k.
Gibson, A. W. . . . .	Tidworth . . . . .	Specialist in Operative Surgery . .	j.
Gatt, J. E. H., M.D. . . .	Cosham . . . . .	. . . . .	—
Gray, A. C. H., M.B. . . .	Aldershot . . . . .	Company Offr. No. 2 Coy. R.A.M.C.	—
Glanvill, E. M., M.B. . . .	Okehampton . . . . .	. . . . .	—
Grant, M. F. . . . .	Netley . . . . .	. . . . .	—
Garland, F. J., M.B. . . .	Manchester . . . . .	. . . . .	—
Gater, A. W. . . . .	Murree, India . . . . .	Officer in charge Military Families' Hospital, Clifdon, and Canton- ment Hospital, Murree	—
Gibbon, T. H., M.D. . . .	Valletta, Malta . . . . .	. . . . .	—
Graham, J. H., M.B. . . .	Gibraltar . . . . .	. . . . .	—
Gotelee, H. E. . . . .	Colombo, Ceylon . . . .	Leave . . . . .	—
Galwey, W. R., M.B. . . .	Dalhousie, India . . . .	. . . . .	b.
Gillatt, W. H., M.B. . . .	Egyptian Army . . . . .	. . . . .	—
Gibson, L. G. . . . .	Dagshai, India . . . . .	Officer in charge Cantonmt. Hosp.	—
Gibson, E., M.B. . . . .	Cairo, Egypt . . . . .	. . . . .	—
Gibson, H. G. . . . .	Valletta, Malta . . . . .	. . . . .	—
Gurley, J. H. . . . .	Alexandria, Egypt . . . .	. . . . .	—
Hodgson, J. E. . . . .	London . . . . .	Sick leave . . . . .	a.
Houghton, J. W. H., M.B.	Aldershot . . . . .	. . . . .	b.
Humphry, L. . . . .	Poona, India . . . . .	Specialist in Operative Surgery . .	j.
Harrison, L. W., M.B. . . .	Rochester Row, London . .	. . . . .	c.
Harvey, F. . . . .	Devonport . . . . .	Sanitary Officer Devonport Dist.	b. c. p.
Hime, H. C. R., M.B. . . .	Bangalore, India . . . .	. . . . .	b. k.
Hartigan, J. A., M.B. . . .	Shorncliffe . . . . .	. . . . .	—
Hyde, D. O., M.B. . . . .	Dublin . . . . .	. . . . .	—
Hamerton, A. F., D.S.O.	Uganda . . . . .	Sleeping Sickness Commission . .	c.
Houghton, G. J. . . . .	Limerick . . . . .	. . . . .	—
Henderson, P. H., M.B. . . .	Ibsley Camp . . . . .	. . . . .	a.
Hunt, R. N., M.B. . . . .	Bordon . . . . .	Officer in charge Reception Station	—
Howley, H. E. J. A. . . . .	Lichfield . . . . .	. . . . .	—
Hull, A. J. . . . .	Dover . . . . .	. . . . .	—
Harding, D. L., F.R.C.S.I.	Belfast . . . . .	. . . . .	—
Hyde, P. G., M.B. . . . .	Dublin . . . . .	. . . . .	—
Harvey, W. J. S. . . . .	Chatham . . . . .	. . . . .	—
Hayes, A. H. . . . .	Dover . . . . .	. . . . .	b. c.
Harding, N. E. J., M.B. . .	Chatham . . . . .	. . . . .	p.
Holden, C. W. . . . .	Tientsin, North China . .	. . . . .	b. p.
Harty, T. E. . . . .	Woolwich . . . . .	. . . . .	—
Hughes, G. W. G. . . . .	Egyptian Army . . . . .	. . . . .	—
Hanafin, P. J. . . . .	Gosport . . . . .	. . . . .	b.
Hildreth, H. C., F.R.C.S.	Glen Imaal . . . . .	Officer in charge N.D. Hospital . .	—
Edin.			
Hole, R. B., M.B. . . . .	Queenstown . . . . .	. . . . .	—
Harding, H., M.B. . . . .	Tidworth Park . . . . .	. . . . .	—
Hayes, G. S. C. . . . .	London . . . . .	. . . . .	h.
Hallowes, R. C., M.B. . . .	Cairo, Egypt . . . . .	Officer in charge Troops, Kasr-el-Nil	—
Harvey, G. A. D. . . . .	Khartoum, Egypt . . . .	" " Military Hospital	—
Heron, G. W. . . . .	Egyptian Army . . . . .	. . . . .	—
Hoar, J. E. . . . .	St. Thomas' Mount . . . .	Officer in charge Section and Can- tonment Hospital	—
Humfrey, R. E., M.B. . . .	Nasirabad, India . . . . .	. . . . .	—
Hastings, A. E. F. . . . .	Allahabad, India . . . .	. . . . .	—
Honeybourne, V. C. . . . .	Mhow, India . . . . .	. . . . .	—
Howell, F. D. G. . . . .	Multan, India . . . . .	. . . . .	—
Heslop, A. H., M.B. . . . .	Rawalpindi, India . . . .	. . . . .	—

Name.	Station.	Appointment.	Specialist Certifi- cates in
Howell, H. L. . . .	Ahmednagar, India . . .	.. .. .	—
Hart, J. C., M.B. . . .	Peking, N. China.. . .	Officer in charge Military Hospital	—
Irvine, F. S., M.B. . . .	Aldershot . . . . .	Adjutant, Dépôt, R.A.M.C. . .	—
Irwin, A. W. A. . . .	Kildare . . . . .	Officer in charge Non-dieted Hosp.	—
Ievers, O., M.B. . . .	Wynberg, S. Africa . . .	.. .. .	—
Irvine, A. E. S. . . .	Simonstown, S. Africa . .	Officer in charge N.D. Hospital .	—
Jameson, A. D. . . .	Aldershot . . . . .	Specialist in Dermatology, Con- naught Hospital	e.
Johnson, J. T., M.D. . .	Newcastle-on-Tyne . . .	.. .. .	b
Jones, J. L. . . . .	Netley . . . . .	.. .. .	—
Johnstone, D. P. . . .	Western Command . . .	.. .. .	b.
Johnson, V. G. . . .	Nowahera, India . . .	Officer in charge Cantonmt. Hosp.	—
Johnson, B. . . . .	Wellington, India . . .	.. .. .	—
Jacob, A. H. . . . .	Gharial, India . . . . .	.. .. .	—
Knox, F. B., M.D. . . .	Colchester . . . . .	.. .. .	b.
Kennedy, J. C., M.B. . .	R.A.M. College . . . . .	Assistant Professor of Pathology	c. p.
Kiddle, H. H. . . . .	.. .. .	.. .. .	—
Kelly, W. D. C., M.B. . .	Dublin . . . . .	.. .. .	j.
Kelly, H. B., M.B. . . .	Curragh . . . . .	.. .. .	—
Kemphorne, G. A. . . .	Dalhousie, India . . .	Officer in charge Cantonmt. Hosp.	—
Keane, M. . . . .	Landour, India . . . . .	.. .. .	—
Kelly, C., M.B. . . . .	Secunderabad, India . . .	.. .. .	—
Kavanagh, E. J., M.B. . .	Ranikhet, India . . . . .	.. .. .	—
Lauder, T. C., M.B. . . .	.. .. .	Leave	b. p.
Leake, J. W. . . . .	Tower Hill, W. Africa . .	Officer in charge Military Hospital	a. b.
Lloyd, R. H. . . . .	Exeter . . . . .	Adjutant, Wessex Div. R.A.M.C.T.	—
Langstaff, J. W. . . .	Aldershot . . . . .	.. .. .	b
LLoyd, L. N., D.S.O. . .	London . . . . .	Adjutant, 1st and 2nd London Division R.A.M.C.T.	—
Lauder, F. P. . . . .	Aldershot . . . . .	Sick leave . . . . .	—
Lelean, P. S., F.R.C.S. Eng. . . . .	Meerut, India . . . . .	Temp. Sanitary Officer, 7th Div.	b j.
L'Estrange, E. F. Q. . .	Bellary, India . . . . .	.. .. .	—
Lambelle, F. W., M.B. . .	York . . . . .	Specialist in Operative Surgery .	j.
Loug, H. W., M.B. . . .	Tower Hill, W. Africa . .	.. .. .	—
Lambert, F. C. . . . .	Wool Camp . . . . .	Officer in charge N.D. Hospital..	—
Lewis, S. E., M.B. . . .	Norwich . . . . .	.. .. .	—
Lewis, R. R. . . . .	Aldershot . . . . .	.. .. .	—
Lucas, T. C., M.B. . . .	Bombay, India . . . . .	Surg. to H.E. the Governor of Bombay.	b.
Luxmoore, E. J. H. . . .	Meerut, India . . . . .	.. .. .	—
Low, N. . . . .	Cannanore, India.. . .	Officer in charge Military Hospital	—
Lloyd Jones, P. A., M.B.	Valletta, Malta . . . . .	.. .. .	—
Lynch, J. P. . . . .	Ranikhet, India . . . . .	.. .. .	—
Lithgow, E. G. R. . . .	Aden . . . . .	Officer in charge Brigade Lab., Staff Surgeon Steamer Point	—
Lewis, R. P. . . . .	Bloemfontem, S. Africa . .	.. .. .	—
Littlejohns, A. S. . . .	Pretoria, S. Africa . . .	.. .. .	—
Leslie, T. C. C. . . . .	Maritzburg, S. Africa . .	.. .. .	—
Leslie, R. W. D. . . . .	Forrest, Malta . . . . .	.. .. .	—
Lathbury, E. B. . . . .	Nasirabad, India . . .	Officer in charge Brigade Lab. . .	—
Lochrin, M. J. . . . .	Bangalore, India . . . .	.. .. .	—
Lunn, W. E. C., M.B. . .	Lahore Cantonment, India	Staff Surgeon . . . . .	—
Loughnan, W. F. M. . .	Bareilly, India . . . . .	Officer in charge Bde. Lab., Special- ist in Prevention of Disease	b.
Leahy, M. P., M.B. . . .	Kirkee, India . . . . .	.. .. .	—
Langrishe, J. du P., M.B.	Poona, India . . . . .	.. .. .	—
MacKenzie, T. C., D.S.O.	Egyptian Army . . . . .	.. .. .	—
Morton, H. M., M.B. . .	Potchefstroom, S. Africa..	.. .. .	—
Matthews, J. . . . .	Karachi, India . . . . .	Specialist in Ophthalmology . .	k.
MacLaughlin, A. M., M.B.	Pirbright Camp . . . . .	Officer in charge Military Hospital	a.
Martin, J. F., M.B. . . .	R.M. College, Sandhurst	Assistant Surgeon . . . . .	—
McDonnell, E., M.B. . .	Bermuda . . . . .	.. .. .	—

Name.	Station.	Appointment.	Specialist Certifi- cates in
McLennan, F., M.B.	Fort George	Officer in charge Military Hospital	—
Murphy, J. P. J., M.B.	Dover	.. .. .	b.
Myles, C. D., M.B.	Southern Command	.. .. .	b.
Mitchell, A. H. McN.	Netley	.. .. .	k.
McMunn, A.	Dublin	.. .. .	—
McKenzie, J., M.B.	Millbank, London	.. .. .	—
Meadows, S. M. W.	Chatham	.. .. .	—
Meldon, J. B.	Curragh	.. .. .	—
MacNicol, R. H., M.B.	Edinburgh	Company Officer	—
McEntire, J. T., M.B.	Newcastle	.. .. .	—
MacDowell, W. MacD.	Willsworthy Camp	.. .. .	—
Moore, E. H. M.	Ross	Officer in charge Military Hospital	—
Meaden, A. A.	Nasirabad, India	.. .. . Cantonmt. Hosp.	—
Millar, C. R.	Cork	.. .. .	—
Maughan, J. St. A.	Cottonera, Malta	.. .. .	—
Meredith, R. G., M.B.	Imtarfa, Malta	Officer in charge Military Hospital	—
Maydon, W. G., M.B.	Secunderabad, India	.. .. .	—
Moss E. L.	Bareilly, India	.. .. .	—
Moriarty, T. B.	Lucknow, India	Officer in charge X-rays Appa- tus, Specialist in Electrical Science, 8th Division	—
McConaghy, W., M.B.	Weymouth	Officer in charge Military Hospital	—
Marett, P. J.	Cottonera, Malta	.. .. .	—
McCaunmon, F. A., M.B.	Quetta, India	Staff Surgeon	—
Morris, C. R. M., M.B.	Sialkot, India	.. .. .	—
Mulligan, J. B. G.	Forrest, Malta	.. .. .	—
Mitchell, W., M.B.	Salathu, India	Officer in charge Cantonmt. Hos-p.	—
McCarthy, D. T., M.B.	Meerut, India	.. .. .	—
Mackenzie, D. F., M.B.	Dimapore, India	.. .. .	p.
McEwen, O. R.	Multan, India	.. .. .	—
Middleton, E. M.	Rawalpindi, India	.. .. .	—
Nicholls, H. M., M.B.	Colaba, India	Embarkation Officer, Bombay, Specialist in Ophthalmology	—
Norman, H. H.	Bhaino, India	Officer in charge Military Hospital	—
Noke, F. H., M.B.	Aldershot	.. .. .	—
Nealor, W. S.	Thayetnyo, India	.. .. .	—
Nimmo, W. C.	Fyzabad, India	Offi. in ch. Cantonmt. Gen. Hosp.	—
Newman, R. F. U., M.B.	Kuldana, India	.. .. .	—
Ormsby, G. J. A., M.D.	Fyzabad, India	Leave	—
O'Reilly, P. S.	Wellington, India	Specialist in Ophthalmology	k.
O'Donoghue, D. J. F.	.. .. .	Leave	—
Omnunney, F. M. M.	Colchester	Anæsthetist	—
Osburn, A. C.	Sheerness	.. .. .	—
Otway, A. L., M.L.	Dublin	.. .. .	—
O'Brien, C. W.	Aden	Officer in charge Crater	—
Ormsrod, G., M.B.	Roorkee, India	.. .. .	—
O'Carroll, A. D., M.B.	Ambala, India	Leave	—
O'Neill, E. M., M.B.	Jhansi, India	.. .. .	—
O'Grady, D. De C.	Baran, India	.. .. .	—
O'Keefe, J. J., M.B.	Hyderabad, India	Leave	—
O'Connor, R. D.	Kasauli, India	.. .. .	—
Packer, H. D.	Devonport	Specialist in Bacteriology	c.
Palmer, H. K.	Colaba, India	.. .. .	—
Palmer, F. J.	Meerut, India	Specialist in Operative Surgery	j.
Prescott, J. J. W., D.S.O.	Newcastle	Adjutant, Northumbrian Division R.A.M.C.T.	k.
Parry, F. M., M.B.	Maidstone	Adjutant, Home Counties Division R.A.M.C.T.	—
Powell, J., M.B.	Egyptian Army	.. .. .	—
Purser, L. M., M.B.	Sialkot, India	Specialist in Otology, Laryngo- logy and Rhinology	g. l.
Popham, R. L.	Cork	Company Officer	—
Power, W. M.	Port Royal, Jamaica	Officer in charge Military Hospital	h.

Name.	Station.	Appointment.	Specialist Certifi- cates in
Pinches, H. G. . . . .	Netley . . . . .	Specialist in Surgery . . . . .	j.
Parsons, A. R. C. . . . .	Scottish Command . . . . .	Officer in charge Can. Hosp., Spe- cialist in Prevention of Disease	c.
Powell, E. W. . . . .	Belgaum, India . . . . .	Ophthalmologist . . . . .	k.
Parkes, E. E., M.B. . . . .	Plymouth . . . . .	Clinical Pathologist . . . . .	b. c.
Potter, T. J. . . . .	Millbank, London . . . . .	Officer in charge Military Hospital	-
Pennfather, F. M. . . . .	Fermoy . . . . .	Staff-Surgeon and in charge Can- tonment General Hospital and Civil Medical Officer	-
Patch, B. G. . . . .	Enniskillen . . . . .		-
Powell, J. E. . . . .	Ranikhet, India . . . . .		-
Pallant, S. L. . . . .	Chatham . . . . .		d.
Painton, G. R. . . . .	West Africa . . . . .		-
Power, P., M.B. . . . .	Cork . . . . .		e.
Pascoe, J. S. . . . .	Cairo, Egypt . . . . .	Officer in charge Troops Abbassiyeh	-
Potts, E. T., M.D. . . . .	Pretoria, S. Africa . . . . .	„ „ Mil. Fam. Hosp.	-
Priestley, H. E. . . . .	Gibraltar . . . . .		-
Paine, E. W. M. . . . .	Calcutt, India . . . . .	Officer in charge Military Hospital	-
Phelan, E. C., M.B. . . . .	Calcutta, India . . . . .		-
Perry, H. M. J. . . . .	Victoria, S. China . . . . .		-
Purdon, W. B., M.B. . . . .	Maymyo, India . . . . .		-
Rutherford, N. J. C., M.B. . . . .	Harrismuth, S. Africa . . . . .		-
Richards, F. G. . . . .	Newcastle, Jamaica . . . . .	Officer in charge Military Hospital	-
Roch, H. S. . . . .	Leeds . . . . .	Adjutant, West Riding Division R.A.M.C.T.	c.
Robinson, J. H. . . . .	Curragh . . . . .	Officer in charge Mil. Fam. Hosp.	h.
Ronayne, C. R. L., M.B. . . . .	Preston . . . . .		k.
Riach, W., M.D. . . . .	London . . . . .	Specialist in Ophthalmology . . . . .	b. k.
Ryan, E. . . . .	Aldershot . . . . .		h.
Rowan-Robinson, F. E., M.B. . . . .	Colchester . . . . .		-
Ritchie, T. F., M.B. . . . .	Pembroke Dock . . . . .		-
Rogers, H., M.B. . . . .	Queenstown . . . . .		-
Reed, G. A. K. H. . . . .	Aldershot . . . . .		r.
Rutherford, R. M. B. . . . .	Scottish Command . . . . .		-
Ranking, H. M., M.B. . . . .	Cork . . . . .		j.
Richmond, J. D., M.B. . . . .	Kilkeuny . . . . .	Officer in charge Military Hospital	-
Rugg, G. F. . . . .	Chatham . . . . .		j.
Ryley, C. . . . .	„ . . . . .		b.
Russell, H. W., M.D. . . . .	London . . . . .		c.
Richard, G. H. . . . .	Magilligan Camp . . . . .	Officer in charge Camp Hospital	-
Roberts, F. E. . . . .	Valletta, Malta . . . . .		-
Rahilly, J. M. B., M.B. . . . .	Cairo, Egypt . . . . .		-
Rose, A. M., M.D. . . . .	Aldershot . . . . .		b.
Rees, G. H., M.B. . . . .	Alexandria, Egypt . . . . .		-
Ritchie, M. B. H., M.B. . . . .	Murree, India . . . . .		-
Robinson, T. T. H., M.B. . . . .	Neemuch, India . . . . .	Offi. in charge Followers' Hosp.	-
Rudkin, G. P. . . . .	Madras, India . . . . .	Staff Surgeon, Fort St. George . . . . .	-
Sloan, J. M., M.B., D.S.O. . . . .	Aberdeen . . . . .	Adjt., Highland Div. R.A.M.C.T.	a.
Simson, H. . . . .	Ahmednagar, India . . . . .	Offi. in charge Cantonment Hosp., Specialist in Prevention of Disease	a.
Seeds, A. A., M.D. . . . .	Hounslow . . . . .		-
Siberry, E. W. . . . .	Pretoria, S. Africa . . . . .	Company Officer . . . . .	-
Smith, C. S., M.B. . . . .	Mullingar . . . . .	Officer in charge Military Hospital	-
Safford, A. H. . . . .	Fyzabad, India . . . . .	„ „ Brig. Laboratory, Spec. in Prevention of Disease	b. c.
Sewell, E. P., M.B. . . . .	Belfast . . . . .	Sanitary Officer, Belfast District	a. b.
Straton, C. H. . . . .	London . . . . .	„ „ area S of Thames and London District	a.
Spillor, W. M. H., M.B. . . . .	Belfast . . . . .	Company Officer . . . . .	b. c.
Shea, H. F., M.B. . . . .	Millbank, London . . . . .	Leave . . . . .	-
Stephens, F. A. . . . .	Birmingham . . . . .	Adjutant, South Midland Division R.A.M.C.T.	-

Name.	Station.	Appointment.	Specialist Certifi- cates in
Steele, W. L. . . . .	Southern Command . . . . .	Specialist in Operative Surgery . . . . .	j.
Sparkes, W. M. B. . . . .	.. .. .	Seconded under Colonial Office . . . . .	i.
Smith, S. B., M.D. . . . .	Dublin . . . . .	.. .. .	b.
Skinner, R. McK. . . . .	Blakan Mati, Straits Setts. . . . .	.. .. .	h.
Shaeahan, G. F. . . . .	Barrackpore, India . . . . .	.. .. .	n.
Sampey, A. W. . . . .	Colchester . . . . .	.. .. .	b. p.
Smallman, A. B., M.B. . . . .	Quetta, India . . . . .	Sanitary Officer, 4th Division . . . . .	b.
Storrs, R. . . . .	Portsmouth . . . . .	.. .. .	h.
Secombe, J. W. S. . . . .	Kasauli, India . . . . .	.. .. .	b.
Skelton, D. S. . . . .	Tregantle . . . . .	Officer in charge Military Hospital . . . . .	b.
Stanley, C. V. B., M.D. . . . .	Egyptian Sanitary Dept. . . . .	.. .. .	—
Stack, H. T., M.B. . . . .	Belfast . . . . .	.. .. .	—
Sylvester-Bradley, C. R. . . . .	Warley . . . . .	.. .. .	—
Sidgwick, H. C. M.B. . . . .	Up Park Camp, Jamaica . . . . .	.. .. .	—
Sinclair, M., M.B. . . . .	Cork . . . . .	Sick Leave . . . . .	—
Sherron, G. H. . . . .	Belgaum, India . . . . .	Special duty with 2nd Leicester- shire Regiment . . . . .	—
Scatchard, T. . . . .	Kailana, India . . . . .	Off. in charge Cantonment Hosp., Chakrata . . . . .	—
Symons, V. H. . . . .	Bloemfontein, S. Africa . . . . .	.. .. .	—
Sampson, F. C., M.B. . . . .	.. .. .	Company Officer . . . . .	—
Smyth, R. S., M.D. . . . .	Ambala, India . . . . .	.. .. .	—
Stewart, H., M.B. . . . .	Upper Topa, India . . . . .	Officer in charge Military Hospital . . . . .	—
Sutcliffe, A. A., M.B. . . . .	Tanglin, Straits Settlements . . . . .	.. .. .	—
Sampson, P. . . . .	Rawalpudi, India . . . . .	.. .. .	—
Scott, J. W. L. . . . .	Quetta, India . . . . .	Leave . . . . .	—
Smales, W. C. . . . .	Poona, India . . . . .	Officer in charge Cant. Hosp. and Spec. in Electrical Science . . . . .	—
Stewart, P. S., M.B. . . . .	Gozo, Malta . . . . .	Officer in charge N.D. Hospital . . . . .	—
Sexton, T. W. O. . . . .	Pretoria, S. Africa . . . . .	Anæsthetist . . . . .	—
Stevenson, G. H., M.B. . . . .	Ambala, India . . . . .	.. .. .	—
Spencer, J. H., M.B. . . . .	Gibraltar . . . . .	.. .. .	—
Sim, J. A. B., M.B. . . . .	Bermuda . . . . .	.. .. .	—
Seafie, C. M. D. . . . .	Colaba, India . . . . .	Off. in charge Brigade Laboratory, Spec. in Prevention of Disease . . . . .	b
Scott, T. H., M.B. . . . .	Ferozepore, India . . . . .	.. .. .	—
Taylor, H. S. . . . .	Fort Canning, Strait Setts. . . . .	Officer in charge Military Hospital . . . . .	—
Tobin, J. . . . .	Devonport . . . . .	.. .. . Mil. Fam. Hosp. . . . .	h.
Thorpe, L. L. G. . . . .	Netley . . . . .	.. .. .	—
Thomson, C. G. . . . .	Amritsar, India . . . . .	Officer in charge Military and Cantonment Hospitals . . . . .	—
Tyndale, W. F., C.M.G., M.B. . . . .	Dublin . . . . .	.. .. .	a. b.
Turner, F. J. . . . .	Buddon Camp . . . . .	Officer in charge Field Hospital . . . . .	—
Thomson, D. S. B., M.B. . . . .	Egyptian Army . . . . .	.. .. .	—
Turner, C. H. . . . .	Murree, India . . . . .	Staff-Surgeon and Specialist in Operative Surgery . . . . .	—
Turnbull, J. A. . . . .	Edinburgh . . . . .	.. .. .	—
Thurston, L. V. . . . .	Jhanspur, India . . . . .	Officer in charge Military Hospital . . . . .	—
Thomson, C. P., M.D. . . . .	Egyptian Army . . . . .	.. .. .	—
Thompson, R. J. C. . . . .	.. .. .	.. .. .	—
Tabuteau, G. G. . . . .	Jhansi, India . . . . .	Staff-Surgeon . . . . .	—
Tate, R. G. H., M.D. . . . .	Ambala, India . . . . .	Leave . . . . .	b.
Thompson, W. I., M.B. . . . .	Lucknow, India . . . . .	.. .. .	—
Turner, F. T. . . . .	Poona, India . . . . .	.. .. .	—
Unwin, T. B., M.B. . . . .	Aldershot . . . . .	.. .. .	—
Vaughan, W. F. H. . . . .	Sick leave . . . . .	.. .. .	—
Vidal, A. C. . . . .	Pretoria, South Africa . . . . .	.. .. .	—
Winkfield, W. B. . . . .	Portland . . . . .	Officer in charge Military Hospital . . . . .	—
Wroughton, A. O. B. . . . .	Dover . . . . .	Sick Leave . . . . .	—
Woodside, W. A. . . . .	Ipswich . . . . .	Adjutant, East Anglian Division R.A.M.C.T. . . . .	e.
Webb, A. L. A. . . . .	Tower Hill, W. Africa . . . . .	Sanitary Officer . . . . .	a. b. p

Name.	Station.	Appointment.	Specialist Certifi- cates in
Winslow, L. F. F.	Lichfield		—
Wood, L.	Fleetwood	Officer in charge Military Hospital	—
Wingate, B. F.	Secunderabad, India		—
Walker, F. S., F.R.C.S.I.	Fernoy		—
Waring, A. D., M.B.	Victoria, Hong Kong		—
Weston, A. F.	Netley	Pathologist	c.
Waters, W. J.	Tidworth Park		—
Whelan, J. F., M.B.	Manchester		—
West, J. W., M.B.	Dublin	Specialist in Operative Surgery	b. j.
Worthington, E. S.	London		j.
Woodley, R. N.	Bulford	Off. in charge Mil. Families' Hosp.	—
Winder, J. H. R., M.D.	Shorncliffe		—
Wilson, R. C., M.B.	Netley		l.
Williamson, A. J., M.B.	Woolwich	Specialist in Operative Surgery	j.
Walker, N. D., M.B.	London		b. r.
Webb, H. G. S.	Ambala, India		b.
Winder, M. G.	Dover		—
Wood, A. E. B., M.B.	Shorncliffe		—
Webster, J. A. W.	Shoeburyness		—
Wilmot, R. C.	Dublin	Company Officer	—
Watson, D. P., M.B.	Western Command		—
Wetherell, M. C., M.D.	Meerut, India	Specialist in Electrical Science	—
Wright, T. J.	Kilbride	Officer in charge Non-dieted Hosp.	b.
Whitehead, E. C., M.B.	Youghal	" " " "	—
Wiley, W., M.B.	Tidworth Park		—
Wilson, H. T.	Barian, India	Officer in charge Military Hos- pital, Specialist in Dermatology	—
Winckworth, H. C.	Limerick		d.
Wallace, G. S., M.B.	Aldershot		b.
Weston, W. J.	Gibraltar	Anæsthetist	—
Ware, G. W. W., M.B.	Sialkot, India		—
Wyatt, C. J., M.B.	Edinburgh		—
White, C. F., M.B.	Rangoon, India		—
Williams, A. S.	Dinapore, India		—
Wood, J. L.	Naini Tal, India		—
Wilson, M. O., M.B.	Bareilly, India		—
White, R. K.	India		—

## LIEUTENANTS.

Byatt, H. V. B.	Poona, India		—
Blake, H. H., M.B.	Allahabad, India	Staff-Surgeon	—
Bradley, F. H., M.B.	Calcutta, India		—
Burney, W. H. S.	Egyptian Army		—
Buist, D. S., M.B.	London	Duty with 1st Life Guards	—
Byrne, A. W., M.B.	Manchester	Officer in charge Military Hospital	—
Benson, C. T. V.	Aldershot		—
Bevis, A. W.	Chatham		—
Beckton, J. J. H.	Dover		—
Conyngham, C. A. T., M.B.	Quetta, India		—
Carson, H. W., M.B.	Peshawar, India		—
Collett, G. G.	Aldershot		—
Clark, J. A., M.B.	Pirbright Camp		—
Clarke, C., M.B.	Dover		—
Cunningham, F.W.M., M.B.	Curragh	Anæsthetist	—
Cane, A. S.	London		—
Comyn, K.	Woolwich		—
Dickson, H. S.	Gibraltar		—

Name.	Station	Appointment.	Specialist Certifi- cates in
Dawson, G. F., M.B.	Chakrata, India	Staff Surgeon	—
Dickenson, R. F. O.T.	Jhansi, India	Officer in charge Brig. Laboratory	b.
Dowling, F. T., M.B.	Nowshera, India	.. ..	—
Dunn, W. J., M.B.	Kirkee, India	.. ..	—
Dalgleish, F. B.	Mhow, India	.. ..	—
Dickson, R. M., M.B.	Lucknow, India	.. ..	—
Davis, A. H. T.	Secunderabad, India	.. ..	—
Dykes, S. S., M.B.	Barry Camp	Officer in charge Field Hospital	—
Dive, G. H.	London	.. ..	—
Dickson, T. H., M.B.	Dublin	.. ..	—
Davies, R. M., M.B.	Chatham	.. ..	—
Ellicombe, J. E.	Kamptee, India	.. ..	—
Eves, T. S., M.B.	Lehong, India	.. ..	—
Elvery, P. G. M.	Curragh	.. ..	—
Edwards, H. R.	Woolwich	.. ..	—
Foster, A. L.	Khyra Gali, India	Officer in charge Section Hospital	—
Fraser, A. E. G.	Cairo, Egypt	.. .. Mil. Fam. Hosp.	—
Franklin, C. L., M.B.	Ashton	.. .. Military Hospital	—
Field, P. C.	Aldershot	.. ..	—
Galgey, R. C.	Up Park Camp, Jamaica	.. ..	—
Gibson, H.	Jhansi, India	.. ..	—
Gregg, R. G. S., M.B.	Lucknow, India	Offi. in charge "Weir Laboratory"	b.
Grant, J. F., M.B.	Benares, India	.. ..	—
Gall, H.	Dover	.. ..	—
Goodwin, Th. G.	.. ..	On probation	—
Gale, R., M.B.	London	.. ..	—
Gilmour, J. M.B.	Devonport	.. ..	—
Gaunt, F. T., M.B.	Shorncliffe	.. ..	—
Hausaff, J. B., F.R.C.S.I.	Sialkot, India	.. ..	—
Hingston, J. C. L.	Tidworth Park	.. ..	—
Hart, H. P., M.B.	Rangoon, India	.. ..	—
Hendry, A., M.B.	Mhow, India	.. ..	—
Harding, C. E. L., M.B.	Punahur, India	Officer in charge Military Hospital	—
Houston, J. W., M.B.	Belgaum, India	.. .. Brig. Laboratory, Specialist in Prev. of Disease	—
Hewson, F. M.	Quetta, India	.. ..	—
Hill, J. R., M.B.	Monmouth	Officer in charge Military Hospital	—
Hayes, L. C., M.B.	London	.. ..	—
Hutchinson, V. P.	Tidworth Park	.. ..	—
Jones, A. E. P., M.D.	Shwabo, India	.. ..	—
James, J., M.B.	Woolwich	.. ..	—
Jones, J. B., M.B.	Londonderry	.. ..	—
Joynt, H. F., M.B.	Hounslow	Officer in charge Heath Hospital	—
Jones, A. G., M.B.	Tidworth	.. ..	—
Keane, G. J., M.D.	.. ..	Seconded under Colonial Office	b. p
Kyle, S. W., M.B.	Belfast	Anæsthetist	—
Kinhead, R. C. G. M., M.B.	Ballyvonare Camp	Officer in charge Troops	—
Lloyd, J. R.	Jubbulpore, India	.. ..	—
Leckie, M.	Egyptian Army	.. ..	—
Leeson, H. H.	Woolwich	.. ..	—
Lane, J. W., M.D.	Dublin	Anæsthetist	—
Lambkin, E. C., M.B.	Caterham	.. ..	—
Laing, F. R., M.B.	.. ..	On probation	—
McGrigor, D. B., M.B.	Quetta, India	.. ..	—
Murphy, L.	Bangalore, India	.. ..	—
McQueen, C.	Pretoria, S. Africa	.. ..	—
McCombe, J. S., M.B.	Bangalore, India	.. ..	—
Marshall, W. E., M.B.	Egyptian Army	.. ..	—
McCreery, A. T. J., M.B.	Tidworth	.. ..	—
McNeill, A. N. R., M.B.	Ayr	Officer in charge Military Hospital	—
Mitchell, T. J., M.B.	Aberdeen	.. ..	—
McArthur, D. H. C., M.B.	London	.. ..	—
Manifold, J. A., M.B.	Piershill and Leith Fort	Officer in charge Troops	—

Name.	Station.	Appointment	Specials Certificates in
McArthur, W. P., M.B.	Aldershot .. ..	.. ..	.. ..
McShoehy, O. W., M.B.	Devonport .. ..	.. ..	.. ..
Mathieson, W. . . .	London .. ..	.. ..	.. ..
Nicholls, T. B., M.B.	Tidworth .. ..	.. ..	.. ..
Nolan, R. H. . . .	Aldershot .. ..	.. ..	.. ..
Nicol, C. M., M.B.	Northampton .. ..	Officer in charge Military Hospital	.. ..
O'Farrell, W. R. . .	Cairo .. ..	.. ..	.. ..
Odium, B. A. . . .	Tidworth .. ..	Anæsthetist .. ..	.. ..
O'Brien-Butler, C. P.	Poona, India .. ..	.. ..	.. ..
O'Kelly, R. . . .	Bangalore, India ..	.. ..	.. ..
O'Rourke, C. H., M.B.	Donard Camp .. ..	Officer in charge Troops .. ..	.. ..
O'Riordan, W. H. . .	York .. ..	Anæsthetist .. ..	.. ..
O'Connor, A. P., M.B.	Shorncliffe .. ..	.. ..	.. ..
Phillips, T. McC., M.B.	Lucknow, India .. ..	.. ..	.. ..
Petit, G. . . .	Meerut, India .. ..	.. ..	.. ..
Pollard, A. M. . . .	Winchester .. ..	.. ..	.. ..
Parkinson, G. S. . .	Dunree Camp .. ..	Officer in charge Camp Hospital	.. ..
Pottinger, D. E. C., M.B.	Glencorse .. ..	„ „ Military Hospital	.. ..
Parsons-Smith, E. M.	London .. ..	.. ..	.. ..
Priest, R. C., M.B.	Colchester .. ..	.. ..	.. ..
Paris, R. C. . . .	Netley .. ..	.. ..	.. ..
Renshaw, J. A. . . .	Cherat, India .. ..	Officer in charge Cantmt. Hosp.	.. ..
Rigby, C. M. . . .	Rangoon, India .. ..	.. ..	.. ..
Ryles, C., M.B. . . .	Karachi, India .. ..	.. ..	.. ..
Ranken, H. S., M.B.	Millbank, London ..	.. ..	.. ..
Roehe, J. J. D., M.B.	Oranmore Camp .. ..	Officer in charge Troops .. ..	.. ..
Renne, W. B., M.B.	Aldershot .. ..	.. ..	.. ..
Robertson, H. G., M.B.	Derby .. ..	.. ..	.. ..
Robb, C., M.B. . . .	Curragh .. ..	.. ..	.. ..
Stuart, F. J., M.B. . .	Kailana, India .. ..	.. ..	.. ..
Spong, W. A., M.B.	Quetta, India .. ..	.. ..	.. ..
Suhr, A. C. H., M.B.	R. A. M. College ..	.. ..	.. ..
Stevenson, A. L., M.B.	Bangalore, India ..	.. ..	.. ..
Shepherd, A., M.B.	Agra, India .. ..	.. ..	.. ..
Saunders, S. M. . . .	Woolwich .. ..	.. ..	.. ..
Sherlock, C. G., M.D.	Mosney Camp .. ..	.. ..	.. ..
Startin, J. . . .	Deepcut and Blackdown	.. ..	.. ..
Somers-Gardner, F. H., M.B.	Hilsea .. ..	.. ..	.. ..
Stack, G. H., M.B.	Mabanta, W. Africa ..	Officer in charge Military Hospital	.. ..
Stirling, A. D., M.B.	Aberdeen .. ..	.. ..	.. ..
Stallybrass, T. W., M.B.	Tidworth Park .. ..	.. ..	.. ..
Stanley, H. V., M.B.	Kilworth Camp .. ..	.. ..	.. ..
Stoney, E. C., M.B.	Ipswich .. ..	Officer in charge Military Hospital	.. ..
Simson, J. T., M.B.	.. ..	On probation .. ..	.. ..
Todd, R. E., M.B.	Alexandria, Egypt ..	.. ..	.. ..
Treves, H. T. . . .	.. ..	Seconded under Colonial Office	.. ..
Tobin, W. J. . . .	Bangalore, India ..	.. ..	.. ..
Tomlinson, P. S. . .	Tidworth .. ..	.. ..	.. ..
Taylor, G. P., M.B.	Irvine Camp .. ..	Officer in charge Field Hospital..	.. ..
Treves, W. W., M.B.	.. ..	On probation .. ..	.. ..
Varvill, B. . . .	Quetta, India .. ..	.. ..	.. ..
Vaughan, E. V., M.B.	Cork .. ..	.. ..	.. ..
Wells, A. G. . . .	Lahore, India .. ..	.. ..	.. ..
Worthington, F. . .	Queenstown .. ..	.. ..	.. ..
Walker, S. G., M.B.	Lucknow, India .. ..	.. ..	.. ..
Wright, W. G. . . .	Netley .. ..	.. ..	.. ..
Wright, A. R., M.B.	Bordon .. ..	.. ..	.. ..
White, M., M.B. . . .	„ .. ..	.. ..	.. ..
Williamson, M. J., M.B.	Fargo Camp .. ..	Officer in charge Observ. Hospital	.. ..
Winder, A. S. M., M.B.	Curragh .. ..	.. ..	.. ..
Weddell, J. M. . . .	London .. ..	.. ..	.. ..
Yourell, J. R., M.B.	Athlone .. ..	Officer in charge Camp Hospital..	.. ..

# MEDICAL OFFICERS OF THE HOUSEHOLD CAVALRY.

Rank.	Name.	Regiment.	Specialist Certifi- cates in
Surg.-Lieutenant-Colonel	Deeble, B. W. C. ..	1st Life Guards ..	—
Surgeon-Major .. ..	Power, J. H. ..	2nd Life Guards ..	—
" " .. ..	Pares, B. ..	Royal Horse Guards ..	—
Surgeon-Captain ..	Cowie, R. M. ..	2nd Life Guards ..	—
" " .. ..	Bodington, P. J., M.B.	Royal Horse Guards ..	—
" " .. ..	Lupton, A. C, M.B. ..	1st Life Guards ..	—

# MEDICAL OFFICERS OF THE BRIGADE OF GUARDS.

Rank.	Name.	Regiment.	Specialist Certifi- cates in
Surg.-Lieutenant Colonel	Crooke - Lawless, Sir W. R., Knt., M.D., C I.E.	Coldstream Guards ..	On Staff of Viceroy of India
" " .. ..	Bateson, J. F., M.B. ..	" " ..	Windsor ..
Surgeon-Major .. ..	Whiston, P. H. ..	Irish Guards ..	Caterham .. b.

# QUARTERMASTERS.

## HONORARY MAJORS.

Name	Station.	Appointment.
Beach, J. H. W. ..	London ..	—
Brake, T. F. ..	Belfast ..	—
Bruce, A. ..	Woolwich ..	Army Medical Stores.
Hasell, H. G. ..	Lichfield ..	—
Hirst, J. ..	Cusham ..	—
Merritt, G. ..	Cape Town, S. Africa ..	—
Short, J. B. ..	London ..	—

## HONORARY CAPTAINS.

Allen, G. L. ..	Curragh ..	—
Attwood, J. ..	Cosham ..	—
Audus, H. J. F. ..	Aldershot ..	—
Brook, H. S. ..	Edinburgh ..	—
Benson, G. A. ..	N. China ..	—
Chalk, A. J. ..	Egypt ..	—
Conolly, J. B. ..	Wynberg, S. Africa ..	—
Crookes, F. ..	Dublin ..	—
Cowan, R. R. ..	Shorncliffe ..	Army Medical Stores.
Essex, B. E. ..	Egypt ..	—
Exton, T. ..	Tidworth ..	—
Glover, H. W. ..	Aldershot ..	—
Green, J. ..	Malta ..	—
Hall, F. W. ..	Aldershot ..	—
Houghton, E. ..	S. Africa ..	—
McClay, J. ..	Woolwich ..	—
Offord, E. P. ..	Gibraltar ..	—
Pilgrim, A. J. ..	Malta ..	—
Scott, R. ..	Netley ..	—
Short, G. F. ..	Dublin ..	—
Spackman, H. ..	Chatham ..	—
Talbot, W. J. C. ..	York ..	—
Whitehorn, J. G. B. ..	Cork ..	—
Wilson, A. ..	Devonport ..	—
Woolley, H. ..	Dover ..	—
Wakefield, H. P. ..	Southampton ..	—
Wheeler, A. ..	Depôt, Aldershot ..	—

## HONORARY LIEUTENANTS.

Name.	Station.	Appointment.
Archibald, W. N. .. ..	Colchester .. ..	—
Clapshaw, A. .. ..	Bloemfontein, S. Africa .. ..	—
Clark, J. .. ..	Woolwich .. ..	—
Cope, T. F. .. ..	Pretoria, S. Africa .. ..	—
Gillman, J. .. ..	Netley .. ..	—
Kinsella, C. W. .. ..	Devonport .. ..	—
Lunney, A. .. ..	Tidworth .. ..	—
Osborne, J. W. .. ..	Netley .. ..	—
Saunders, E. V. .. ..	Hong Kong .. ..	—
Watkins, J. .. ..	Chester .. ..	—
Wilson, J. .. ..	War Office .. ..	—

## RETIRED MEDICAL OFFICERS OF THE REGULAR ARMY WHO ARE EMPLOYED.

Rank.	Name.	Station where Employed.
Major .. ..	Allport, C. W., M.D. .. ..	Great Yarmouth.
Lieut.-Colonel .. ..	Archer, T. .. ..	Lydd.
Lieut.-Colonel .. ..	Baird, A., M.B., F.R.C.S. Edin. .. ..	Worcester.
Lieut.-Colonel .. ..	Barnes, R. W. .. ..	Dorchester.
Lieut.-Colonel .. ..	Battersby, H. L. .. ..	Bodmin.
Lieut.-Colonel .. ..	Bourke, U. J., M.B. .. ..	Hamilton.
Colonel .. ..	Browne, A. L., M.D. .. ..	Taunton.
Lieut.-Colonel .. ..	Browne, A. W. .. ..	Armagh.
Major .. ..	Burke, J. F. .. ..	Lancaster.
Major .. ..	Butterworth, S. .. ..	Carlisle.
Lieut.-Colonel .. ..	Charlesworth, H., C.M.G. .. ..	Nottingham.
Lieut.-Colonel .. ..	Clements, W. G. .. ..	Christchurch.
Lieut.-Colonel .. ..	Corkery, T. H. .. ..	Exeter.
Captain .. ..	Cotton, H. .. ..	Ipswich.
Lieut. Colonel .. ..	Coutts, G. .. ..	Chichester.
Major .. ..	Davoren, V. H. W. .. ..	Bury St. Edmund's.
Major .. ..	Dillon, H. V. .. ..	Scarborough.
Lieut.-Colonel .. ..	Downman, W. S. .. ..	Northampton.
Major .. ..	Duggan, C. W. .. ..	Lincoln.
Lieut.-Colonel .. ..	Duncan, S. E. .. ..	Shrewsbury.
Lieut.-Colonel .. ..	Finlay, W. .. ..	Jersey.
Lieut.-Colonel .. ..	Gormley, J. A., M.D. .. ..	Kingston.
Lieut.-Colonel .. ..	Greig, F. J. .. ..	Stirling.
Lieut.-Colonel .. ..	Hodson, R. D. .. ..	Trowbridge.
Lieut.-Colonel .. ..	Hosie, A. .. ..	Sandown.
Lieut.-Colonel .. ..	Kay, A. G., M.B. .. ..	Clifton, Bristol.
Lieut.-Colonel .. ..	Kearney, J., M.D. .. ..	Wrexham.
Lieut.-Colonel .. ..	Keays, W. .. ..	Weymouth.
Major .. ..	McCormack, R. J., M.D. .. ..	Omagh.
Lieut.-Colonel .. ..	McCreery, B. T., M.B., F.R.C.S.I. .. ..	Perth.
Major .. ..	Moir, J. D. .. ..	Port Eford and Mutley District.
Lieut.-Colonel .. ..	Mosse, C. G. D., F.R.C.S.I. .. ..	Guernsey.
Major .. ..	Myles, E. H., M.B. .. ..	Guernsey.
Lieut.-Colonel .. ..	Nicolls, J. M., M.B. .. ..	Detention Barracks, Cork.
Lieut.-Colonel .. ..	Osborne, J. .. ..	Galway.
Colonel .. ..	Parker, W. A. .. ..	Penally.
Major .. ..	Peeke, H. S. .. ..	Derby.
Major .. ..	Power, R. I. .. ..	Waterford.
Lieut.-Colonel .. ..	Poynder, G. F. .. ..	Bodford.
Lieut.-Colonel .. ..	Riordan, J., M.B. .. ..	Clonmel.
Surgeon-Lieut.-Colonel .. ..	Robinson, G. S. .. ..	Eastbourne.
Lieut.-Colonel .. ..	Rowney, W., M.D. .. ..	Manchester.
Lieut.-Colonel .. ..	Scanlan, A. De C. .. ..	Guildford.
Lieut.-Colonel .. ..	Scott, H., M.B. .. ..	Landguard Fort.
Major .. ..	Spence, A. E. C., M.B. .. ..	Warwick.
Lieut.-Colonel .. ..	Stokes, H. H., M.D. .. ..	Oxford.

Rank.	Name.	Station where employed.
Lieut.-Colonel .. ..	Trewman, G. T. .. ..	Reading.
Major .. ..	Trotter, W. J. .. ..	Naas.
Lieut.-Colonel .. ..	Tuckey, T. B. A. .. ..	Detention Barracks, York.
Major .. ..	Wade, G. A. .. ..	Horfield.
Lieut.-Colonel .. ..	Whitty, M. J., M.D. .. ..	Liverpool.
Lieut.-Colonel .. ..	Williamson, J. G. .. ..	Leicester.
Lieut.-Colonel .. ..	Wilson, E. M., C.B., C.M.G., D.S.O.	Record Office, Aldershot.
Lieut.-Colonel .. ..	Woods, C. R., M.D. .. ..	Birr.
Major .. ..	Wright, A. .. ..	Falmouth.
Major .. ..	Zimmermann, B. F. .. ..	Topsham, Exeter.

RETIRED MEDICAL OFFICERS OF THE REGULAR ARMY WHO ARE EMPLOYED  
AS STAFF OFFICERS TO THE ADMINISTRATIVE MEDICAL OFFICERS  
OF THE TERRITORIAL FORCE.

Rank	Name	Division
Major .. ..	Freeman, E. C., M.D. .. ..	East Anglian Division.
Lieut.-Colonel .. ..	Haywood, L., M.B. .. ..	South Midland Division.
Lieut.-Colonel .. ..	Irvine, D. L. .. ..	North Midland Division.
Lieut.-Colonel .. ..	Day, W. B. .. ..	2nd London Division.
Lieut.-Colonel .. ..	Reckitt, J. D. T. .. ..	1st London Division.
Colonel .. ..	Webb, C. A. .. ..	Wessex Division.
Lieut.-Colonel .. ..	Wight, E. O. .. ..	Home Counties Division.

# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

## Corps News.

JULY, 1910.

### ARMY MEDICAL SERVICE.

Lieutenant-Colonel Menus W. O'Keeffe, from the Royal Army Medical Corps, to be Colonel, *vice* Colonel J. G. MacNeece, promoted, dated April 23, 1910.

Lieutenant-Colonel Charles H. Burtchaell, M.B., Royal Army Medical Corps, to be Assistant Director-General, *vice* Lieutenant-Colonel J. M. Irwin, M.B., whose tenure of that appointment has expired, dated June 1, 1910.

### ROYAL ARMY MEDICAL CORPS.

The undermentioned Lieutenants are confirmed in that rank: Theodore W. Stallybrass, M.B., Victor P. Hutchinson.

The undermentioned Lieutenant-Colonels retire on retired pay, dated June 1, 1910.

James H. Curtis.

He entered the Service on May 30, 1885; became Surgeon-Major July 31, 1897; Lieutenant-Colonel May 30, 1905, and retired on retired pay on June 4, 1910.

His war service is as follows: South African War, 1899-1901-1902—Relief of Ladysmith, including action at Colenso; operations of January 17 to 24, 1900, and action at Spion Kop, operations of February 5 to 7, 1900, and action at Vaal Kranz; operations on Tugela Heights, February 14 to 27, 1900, and action at Pieters Hill; operations in the Transvaal in May and June, 1900; operations in Natal, March and April, 1900; operations in the Transvaal, east of Pretoria, July to November 29, 1900, including action at Reit Vlei; operations in Cape Colony, south of Orange River, April, 1900; operations in Cape Colony, north of Orange River, April and May, 1900; operations in the Transvaal and Orange River Colony, 1900-02. Queen's Medal with clasp. King's Medal with two clasps.

William B. Day, M.B.

He entered the Service on May 30, 1885; became Surgeon-Major May 30, 1897; and Lieutenant-Colonel on May 30, 1905.

He was placed on temporary half-pay on account of ill-health on September 30, 1908, and restored to the Establishment on July 1, 1909, and retired on retired pay on June 4, 1910.

His war service is: South African War, 1900-2; operations in the Transvaal, August, 1901; operations in Orange River Colony, February to July, 1901, and September, 1901, to May 31, 1902; operations in Cape Colony, November, 1900, to February, 1901. Queen's Medal with three clasps. King's Medal with two clasps.

The undermentioned Quartermasters and Honorary Majors are placed on retired pay:—

Edward Lines, dated May 16, 1910.

Charles Crawley, dated May 17, 1910.

Serjeant-Major James Clark to be Quartermaster, with the honorary rank of Lieutenant, *vice* Honorary Major E. Lines, dated May 18, 1910.

The undermentioned Quartermasters and Honorary Lieutenants are granted the honorary rank of Captain :—

Thomas Exton, dated May 23, 1910.

Roderick R. Cowan, dated May 30, 1910.

George A. Benson, dated June 2, 1910.

**TRANSFERS.**—Lieutenant-Colonel J. M. Irwin from the War Office to the Eastern Command; Major W. A. Ward from the London District to the Southern Command; Captain J. W. H. Houghton from the London District to the Aldershot Command; Captain F. J. Brakenridge from the London District to the Eastern Command.

**ARRIVALS HOME ON LEAVE.**—From India. Colonel H. J. W. Barrow. Lieutenant Colonels C. E. Nichol, D.S.O., B. M. Skinner, M.V.O., and J. S. Green. Captain A. Chopping. From South Africa. Captains S. G. Butler and V. H. Symons. From Hong Kong. Colonel W. G. A. Bedford, C.M.G. From Gibraltar; Major E. W. P. V. Marriott and Captain J. H. Spencer. From Malta. Major H. C. French. From Egypt: Majors F. P. Carroll and S. de C. O'Grady. Captains G. W. G. Hughes and W. Byam. From West Coast of Africa. Captain G. R. Panton. From Jamaica: Lieutenant-Colonel H. O. Trevor. From Mauritius. Lieutenant-Colonel W. G. Birrell.

**EMBARKATION.**—For South Africa: Brevet-Colonel F. J. Lambkin.

**POSTING.**—Quartermaster and Honorary Lieutenant J. Clark has been posted to Woolwich for duty.

**HIGHER RATE OF PAY.**—Lieutenant-Colonel T. J. O'Donnell, D.S.O., has been selected for the higher rate of pay, under Article 317, Royal Warrant, with effect from April 23, 1910, *vice* Lieutenant-Colonel M. W. O'Keeffe promoted.

**QUALIFICATION.**—Major H. P. W. Barrow has obtained the Diploma in Public Health of the University of Cambridge.

**ROSTER FOR SERVICE ABROAD.** The names of Lieutenant-Colonels T. W. O'H. Hamilton, C.M.G., and J. B. W. Buchanan have been removed from the roster on their notifying their intention to retire.

Lieutenant-Colonel T. H. F. Clarkson's name has been added to the list of Officers required to proceed abroad during the coming season.

**EXCHANGES.**—The following exchanges have been approved. Captain A. W. A. Irwin and J. N. Spencer, Captain W. C. Croly, and G. S. C. Hayes.

The following are the Commands to which Quartermasters proceeding abroad have been detailed. Hon. Captain F. W. Hall, South Africa; Hon. Captain J. Attwood, North China.

**APPOINTMENTS, ROYAL ARMY MEDICAL CORPS.**—Lieutenant-Colonel W. B. Day, Staff Officer to the Administrative Medical Officer of the 2nd London Division, Territorial Force. Major W. A. Ward, Specialist in Dermatology, &c., at the Alexandra Hospital, Cosham.

**APPOINTMENTS, RETIRED PAY.**—Lieutenant-Colonel S. E. Duncan, Medical Charge at Shrewsbury. Lieutenant-Colonel H. Scott, Medical Charge at Landguard Fort.

The General Medical Council have agreed to recognise, under Rule 3 (f) of the Rules and Regulations of the General Medical Council, for Diplomas in Public Health, the certificate granted by the Sanitary Officers of the following Divisions in India: Peshawar, Rawal Pindi, Lahore, Mhow, Poona, Meerut, Lucknow, Secunderabad, and Burma.

## RESULTS OF EXAMINATION OF MAJORS AND LIEUTENANTS, ROYAL ARMY MEDICAL CORPS.

The following results of examinations are notified for general information :—

Passed in Military Law for the rank of Lieutenant-Colonel: Majors G. E. F. Stammers (78 per cent.); J. McD. McCarthy, G. S. Mansfield, M.B., M. McG. Rattray. Passed in technical subjects for the rank of Lieutenant-Colonel. Major C. W. Profet, M.B.

Passed in A. M. O.: F. W. Hardy, M.B. (88.5 per cent.); G. S. Mansfield, M.B.; B. W. Longhurst; E. S. Clark, M.B.; S. and E.: C. B. Lawson, M.B.; D. Lawson; H. A. Berryman; B. W. Longhurst; H. W. H. O'Reilly; *Med. Hrs.*: D. Lawson; H. A. Berryman (83 per cent.); L. A. Mitchell, M.B.; E. S. Clark, M.B.

Passed in (b) for rank of Captain: H. H. Blake, M.B.; R. E. Todd, M.B. O. R. McEwen; J. du P. Langrishe, M.B.; H. S. Dickson; C. H. O'Rourke, M.B.; J. W. Lane, M.D.; S. W. Kyle, M.B.; G. S. Parkinson; F. H. M. Chapman; T. McC. Phillips, M.B.; W. G. Wright; A. T. J. McCreery, M.B.; T. J. Mitchell, M.D.; G. F. Rudkin; S. McK. Saunders; H. H. Leeson.

#### PROMOTIONS.

10087 Serjeant E. Canterbury, June 1, 1910, to be Staff-Serjeant (special under para. 351, K.R.)

*To be Lance-Corporals.*—Special under para. 281, S.O., R.A.M.C., 19652 Private C. V. Jefford, June 1, 1910; 764 Private R. Boddy, June 1, 1910; 148 Private T. H. Allbeury, June 9, 1910.

*TRANSFERS TO OTHER CORPS.*—18915 Serjeant A. E. Barrett, May 11, 1910, to Territorial Forces; 1628 Private F. Rogers, June 9, 1910, to 21st Lancers.

*DISCHARGES.*—17901 Staff-Serjeant G. P. Jones, May 25, 1910, termination of engagement; 1893 Private W. E. Rance, May 19, 1910, medically unfit; 18822 Private G. H. Lanagan, May 21, 1910, on payment of £25; 11811 Private L. H. Chapman, May 31, 1910, termination of first period; 4563 Private H. B. Ironside, May 31, 1910, on payment of £18.

*TRANSFERS TO ARMY RESERVE.*—17639 Private A. Copley, May 26, 1910; 1105 Private Wm. Barson, May 23, 1910; 1106 Private R. Canham, May 23, 1910; 2227 Private J. Dixon, May 26, 1910; 18000 Private J. Payne, May 22, 1910; 17671 Private J. Sweeney, May 26, 1910; 17625 Lance-Corporal H. Welsh, May 5, 1910; 1675 Private P. Horrigan, June 2, 1910; 17677 Private G. Sheldron, June 3, 1910; 17676 Private R. Moston, June 3, 1910; 17678 Private J. S. Noakes, June 4, 1910; 1717 Private H. Emmet, June 3, 1910; 1109 Private R. G. Jameson, June 3, 1910; 17691 Corporal A. Shearon, June 4, 1910; 17684 Private W. Mollison, June 6, 1910; 17707 Private P. T aylor, June 9, 1910; 17700 Private T. Wilson, June 9, 1910; 17698 Private A. Betterton, June 8, 1910.

#### EMBARKATION FOR ABROAD.

To Jamaica, per ss. "Port Royal," May 27, 1910: 11566 Corporal M. T. Brown.

#### DISEMBARKATION FROM ABROAD.

From Malta, per ss. "Menes," May 14, 1910: 11994 Corporal A. Myatt.

#### DEATHS.

19466 Private T. Daly, May 14, 1910, at South Africa; 1731 Private C. Northcott, June 2, 1910, at Woolwich; 11824 Private C. C. Glendinning, June 4, 1910, at York.

#### THE FOLLOWING N.C.O.'s AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS:—

*For Quartermaster-Serjeant.*—10445 Staff-Serjeant E. Haynes.

*For Staff-Serjeant.*—9053 Serjeant E. J. Lovegrove, 18432 Serjeant G. F. Pearce, 10598 Serjeant P. G. Knightley, 9747 Serjeant C. Williams, 10087 Serjeant E. Canterbury, 11049 Serjeant W. T. A. Ulph, 18718 Serjeant W. H. Parr, 10736 Serjeant G. E. Gray, 17843 Serjeant R. C. Blair.

*For Serjeant.*—12676 Lance-Serjeant E. A. Young, 12557 Corporal P. Harvey, 12989 Corporal E. G. W. Barnes, 17736 Corporal J. D. Keeble, 17022 Corporal A. R. Weaver, 16002 Corporal H. W. Amsden, 10005 Serjeant W. T. Hughes, 15483 Lance-Serjeant E. Sharpe, 17057 Lance-Serjeant M. Ward, 11513 Corporal G. Hinton, 10965 Corporal J. Howlett, 13032 Corporal T. Kerr.

*For Corporal.*—1305 Private H. M. Prince, 2258 Private W. Edmonds, 19276 Private J. J. Young, 18243 Private W. Vincent, 19566 Private F. G. Dowers, 756 Private G. Pateman, 984 Private T. Giles, 19368 Private J. Hazel.

Serjeant A. P. Spackman has been selected for duty with the Egyptian Army, *vice* Staff-Serjeant Squires.

Serjeants J. McLennan and J. H. Wolfe have been selected for duty with the Medical Department of Northern Nigeria.

Serjeant G. D. Christie rejoins the Corps, from the Medical Department of Northern Nigeria, on July 8.

Serjeant J. Cameron's appointment with the Medical Department of Northern Nigeria has been extended for a further tour.

Quartermaster-Serjeant H. Barton has joined the London District for temporary duty at the War Office.

No. 7 Serjeant L. G. Walton, and No. 566 Corporal A. Pennington, 1st West Lancashire Field Ambulance, R.A.M.C.(T.F.), have, after examination, qualified as Army Dispensers, under Appendix 2, v. 20, Standing Orders, Royal Army Medical Corps.

Owing to the large number of N.C.O.'s and men waiting for admission into Queen Alexandra's Imperial Military Nursing Service, it has been decided to raise the establishment from 40 to 50.

**NOTES FROM ALDERSHOT.**—Lieutenant-Colonel G. D. Hunter, D.S.O., Major H. G. F. Stallard, Captain F. S. Irvine, and fifty N.C.O.'s and men of the Depot R.A.M.C., represented the Corps in the funeral procession of his late Majesty King Edward VII.

The detachment left Aldershot by special train at 2.15 p.m. on May 19, and, marching from Nine Elms Station, camped in Kensington Gardens. The following morning the detachment left the Gardens at 6.45 a.m. Some difficulty was experienced in making way through the crowd in Piccadilly. The Mall was reached at 7.45 a.m., and the detachment took up its position. Here a long wait ensued until the procession moved off at 9.50 a.m. On reaching Paddington the detachment marched back to its camp in Kensington Gardens, which it left the following morning for Aldershot.

Although the heat was very trying none of the men fell out, and their conduct and general behaviour during the whole time was excellent.

**NOTES FROM SIMLA.**—Lieutenant-Colonel R. S. F. Henderson, R.A.M.C., Secretary to Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated May 19, 1910:—

"*Appointments.*—Surgeon-General J. G. MacNeece appointed Principal Medical Officer, 8th (Lucknow) Division, with effect from April 24, 1910, *vice* Surgeon-General Ellis, retired.

"Colonel M. W. Kerin, Officiating Principal Medical Officer, 8th (Lucknow) Division, reverted to his substantive appointment as Principal Medical Officer, Bareilly and Garhwal Brigades, on the appointment of Surgeon-General MacNeece.

"Lieutenant-Colonel W. A. Morris, appointed Officiating Principal Medical Officer, Allahabad and Fyzabad Brigades, *vice* Colonel L. E. Anderson, on leave.

"*Leave.*—The following officer is granted extension of medical certificate leave ex India:—

"Captain M. J. Cromie, from April 11, 1910, to July 10, 1910.

"*Relief.*—List of officers whose tour will expire during the coming trooping season, by seniority, is attached.

"*Specialists.*—The following officers are appointed specialists in the subjects named:—

"Major E. M. Williams, midwifery and diseases of women and children, 8th (Lucknow) Division.

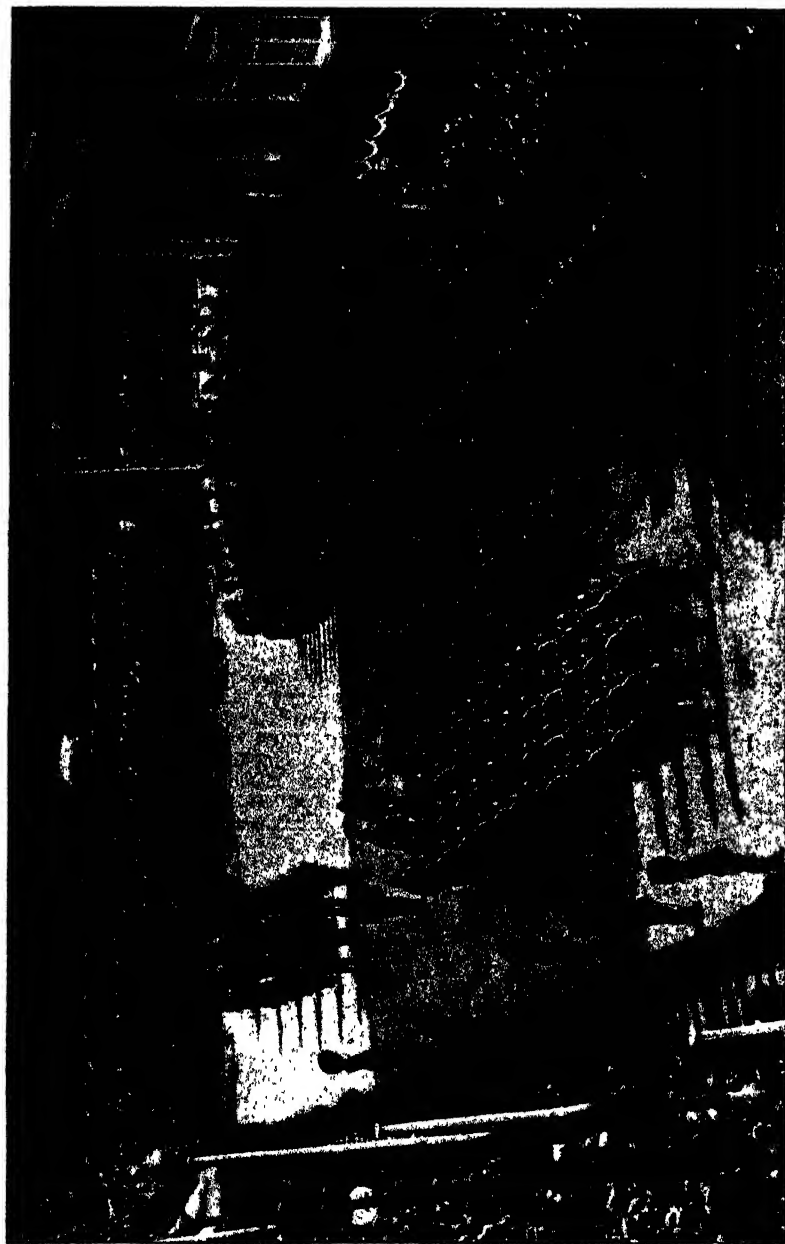
"Captain W. Bennet, prevention of disease, 8th (Lucknow) Division.

"Lieutenant H. P. Hart, Dermatology, Burma Division.

**"NOMINAL ROLL OF ROYAL ARMY MEDICAL CORPS OFFICERS ON THE INDIAN ESTABLISHMENT, WHO WILL BE TOUR EXPIRED DURING THE TROOPING SEASON OF 1910-11.**

"(Names entered in the order of seniority.)

"Lieutenant-Colonel T. J. O'Donnell, D.S.O.; Lieutenant-Colonel W. B. Thomson; Lieutenant-Colonel T. B. Winter; Lieutenant-Colonel G. F. Gubbin; Lieutenant-Colonel B. T. McCreery, M.B., F.R.C.S.I., D.P.H. (placed on half pay on March 6, 1910); Lieutenant-Colonel L. W. Swabey; Lieutenant-Colonel W. E. Berryman; Lieutenant-Colonel J. Moek, M.D.; Lieutenant-Colonel A. E. Morris, M.D.; Lieutenant-Colonel J. M. F. Shine, M.D. (service extended by one year to season of 1911-12); Lieutenant-Colonel G. Cree; Lieutenant-Colonel W. H. Starr (service extended by one year to season of 1911-12); Brevet-Lieutenant-Colonel O. R. A. Julian, C.M.G.; Major C. A. Stone, M.D.; Major H. A. Hunge; Major A. H. Waring; Major G. B. Riddick; Captain R. Selby, M.B. (service extended by one year to season of 1911-12); Captain F. J. C. Hefferman, F.R.C.S.I.; Captain C. G. Thomson; Captain A. B. Smallman, M.B.; Captain W. F. Ellis; Captain C. H. J. Brown, M.B.; Captain J. E. Powell; Captain G. A. Kempthorne; Captain M. C. Wetherell, M.D.; Captain C. H. Turner;



*Photographed by Messrs. Gale and Falden.]* DETACHMENT OF THE ROYAL ARMY MEDICAL CORPS.

Captain C. T. Lucas, M.B. (granted further extension of his Indian tour (seconded) for the period of Sir George Clarke's tenure as Governor of Bombay); Captain A. A. Meaden; Captain R. J. Cahill, M.B.; Captain S. C. Bowle; Captain P. Dwyer, M.B.; Captain H. T. Wilson; Captain J. H. Campbell, M.B.; Captain E. J. H. Luxmoore; Captain N. Low; Captain R. H. L. Cordner; Captain K. A. C. Doig; Captain H. O. M. Beadnell; Captain L. V. Thurston; Captain A. W. Gater; Captain J. P. Lynch; Captain G. B. F. Churchill; Captain W. S. Neale; Captain A. A. McNeigh, M.B.; Captain J. E. Hoar; Captain F. B. Booth, M.D.; Captain E. C. R. Lithgow; Captain C. W. O'Brien; Captain G. G. Tabuteau; Captain R. F. Humfrey, M.B. (service extended by one year to season of 1911-12); Captain W. G. Maydon, M.B.; Captain G. Ormrod, M.B.; Captain M. J. Cromie."

## TERRITORIAL FORCE.

### YEOMANRY.

*Montgomeryshire*.—Surgeon-Captain Francis E. Marston, resigns his commission, dated April 4, 1910.

### INFANTRY.

*4th Battalion, Alexandra, Princess of Wales Own (Yorkshire Regiment)*.—Surgeon-Lieutenant Clarence B. Whitehead, M.B., to be Surgeon-Captain, dated September 24, 1909.

Supernumery Captain Austin Graham is restored to the Establishment, dated March 15, 1910.

### ROYAL ARMY MEDICAL CORPS.

*1st South Western Mounted Brigade Field Ambulance*.—The appointment to a Lieutenancy of Robert Pounden Beatty, M.D., which was announced in the *London Gazette* of April 12, 1910, is cancelled.

*1st Wessex Field Ambulance*.—Major Ransom Pickard, M.D., to be Lieutenant-Colonel, dated March 29, 1910.

*3rd London (City of London) Field Ambulance*.—Quartermaster and Honorary Major James W. Bennett resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated January 12, 1910.

*3rd Wessex Field Ambulance*.—Quartermaster and Honorary Lieutenant Philip W. Munn resigns his commission, dated February 28, 1910.

Quartermaster-Sergeant Charles William Hearn, from the 6th (Duke of Connaught's Own) Battalion, the Hampshire Regiment, to be Quartermaster, with the honorary rank of Lieutenant, dated May 25, 1910.

*1st East Lancashire Field Ambulance*.—Captain Gordon William Fitzgerald, from the 3rd East Lancashire Field Ambulance, Royal Army Medical Corps, to be Captain, dated May 14, 1910.

Albert Ramsbottom, M.D. (late Captain 2nd Western General Hospital, Royal Army Medical Corps) to be Lieutenant, dated May 14, 1910.

*3rd East Lancashire Field Ambulance*.—Lieutenant Robert Burnett, M.B., from the list of officers attached to Units other than Medical Units, to be Lieutenant, dated May 14, 1910.

Edward Harvie Cox, M.B., to be Lieutenant, dated May 14, 1910.

*1st Welsh Field Ambulance*.—Major Thomas L. K. Davis, M.B., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated April 30, 1910.

*1st Southern General Hospital*.—Albert Hastings, to be Quartermaster, with the honorary rank of Lieutenant, dated April 19, 1910.

*2nd Western General Hospital*.—Captain Albert Ramsbottom, M.D., resigns his commission, dated May 14, 1910.

*2nd East Lancashire Field Ambulance*.—Lieutenant-Colonel John J. K. Fairclough resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated May 1, 1910.

*Highland Mounted Brigade Field Ambulance*.—Lieutenant-Colonel John Macdonald, M.B., reverts at his own request to the rank of Major, dated April 5, 1910.

Major John Macdonald, M.B., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated April 6, 1910.

*1st Highland Field Ambulance*.—Quartermaster and Honorary Lieutenant John Cromar, resigns his commission, dated April 30, 1910.

*1st Highland Field Ambulance*.—The undermentioned officers to be Majors, dated April 1, 1908:—

Captain Alexander Ogston, M.B.

Captain Thomas Fraser, M.B.

*2nd Highland Field Ambulance*.—Captain Francis Kelly to be Major, dated April 1, 1908.

*3rd Highland Field Ambulance*.—Captain William E. Foggie, M.B., to be Major, dated April 1, 1908.

*1st Scottish General Hospital*.—Major Arthur Hugh Lister, M.B., from 2nd Highland Field Ambulance, Royal Army Medical Corps, to be Major, whose services will be available on mobilisation, dated December 1, 1909.

Major Arthur H. Lister, M.B., to be Lieutenant-Colonel, dated May 22, 1910.

*For attachment to Units other than Medical Units.*

Andrew George Tottenham Hanks to be Lieutenant, dated April 6, 1910.

Robert Waterhouse, M.D., to be Lieutenant, dated April 15, 1910.

Edward Oscar Libbey, to be Lieutenant, dated March 23, 1910.

Donald Gray MacGill to be Lieutenant, dated April 1, 1910.

Captain Walter Reginald Norman Smithan, M.B., from the 1st East Lancashire Field Ambulance, Royal Army Medical Corps, to be Captain, dated May 2, 1910.

John Tait to be Lieutenant, dated June 30, 1909.

William John Harrison, M.B., to be Lieutenant, dated April 22, 1910.

Cuthbert Delaval Shafto Agassiz, M.B., to be Lieutenant, dated April 30, 1910.

Francis Dawson Blandy, M.D., to be Lieutenant, dated May 3, 1910.

Lieutenant John A. Gibb, M.B., to be Captain, dated December 2, 1909.

Richard Vernon Favell to be Lieutenant, dated April 15, 1910.

*Attached to Units other than Medical Units.*

Lieutenant Frederic R. Sutton, M.D., resigns his commission, dated April 13, 1910.

Lieutenant Henry Smurthwaite, M.D., resigns his commission, dated April 22, 1910.

Captain Charles W. Crawshaw, M.B., resigns his commission, dated April 30, 1910.

Lieutenant John W. T. Walker, M.B., to be Captain, dated April 1, 1908.

Lieutenant Robert V. G. Monckton, M.D., resigns his commission, dated May 9, 1910.

### QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

*Postings and Transfers*.—Sisters: Miss E. C. Cheetham, to London, on return from South Africa. Staff-Nurses: Miss M. A. Cachemaille, to Egypt, from Cambridge Hospital, Aldershot; Miss E. J. French, to Woolwich, from Connaught Hospital, Aldershot; Miss G. F. V. Temperley, to Connaught Hospital, Aldershot, from Woolwich.

*Appointments Confirmed*.—Staff Nurses: Miss J. Findlater, Miss M. S. Mason.

## ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

THE Ninty-fifth Annual General Meeting, followed by a Special General Meeting, was held at the Royal United Service Institution, Whitehall, on Tuesday, May 24, 1910, having been postponed from Wednesday, May 17, in consequence of the lamented death of His late Majesty King Edward VII.

### Present.

Deputy-Surgeon-General W. G. Don, Vice-President, in the Chair.

Surgeon-Generals Sir Charles Cuffe, K.C.B., G. J. H. Evatt, C.B., and H. F. Paterson.

Colonels W. T. Martin, J. Lane Notter, and D. Wardrop, C.V.O.

Lieutenant-Colonels A. F. S. Clarke, A. M. Davies, Sir W. B. Leishman, F.R.S., W. B. Miller, and R. H. S. Sawyer.

Majors E. L. McSheehy and C. E. Pollock.

The notices in *The Times* convening the meeting having been read, the Chairman said:—

"GENTLEMEN,—Before proceeding to business it is fitting that we, in common with similar meetings at the present time, should give expression to our sense of loss, not only as loyal subjects, but as faithful servants of the late King Edward. I beg, therefore, to move that the following resolution, expressing sorrow, sympathy, and loyalty, which has been entirely approved by the Director-General, be recorded in the Minutes of this Annual General Meeting of the Society."

## RESOLUTION.

"That this Meeting desires to record in its Minutes the great loss sustained by all citizens and servants of the Empire in the lamented death of our beloved Sovereign Lord King Edward; and to extend, respectfully, its deep sympathy to the Queen Mother, to the King and Queen, and all the Members of the Royal House in their bereavement. Further: to record its unalterable loyalty and devotion to the Person and Throne of His Majesty King George V."

The Resolution, moved from the Chair, was adopted in silence, all the members standing.

(1) The Minutes of the previous Annual General Meeting of May 19, 1909, were read and confirmed.

(2) The election of the following officers of the Society was moved from the Chair and adopted unanimously:—

Surgeon-General W. L. Gubbins, C.B., M.V.O. K.H.S., to be President, *vice* Surgeon-General Sir A. Keogh, K.C.B., resigned.

Surgeon-General W. S. M. Price to be an additional Vice-President.

Lieutenant-Colonel A. F. S. Clarke, to be a Trustee, *vice* Deputy-Surgeon-General C. A. Innes, resigned.

(3) The election by the Committee, as members thereof, under Rule XXVI., of Colonel D. Wardrop, C.V.O., and Major C. E. Pollock was confirmed.

(4) The following were unanimously elected to fill the vacancies on the Committee:—  
Surgeon-General Sir Charles Cuffe, K.C.B., proposed by Colonel J. L. Notter, seconded by Major McSheehy. Brevet-Lieutenant-Colonel Sir W. B. Leishman, F.R.S., proposed by Lieutenant-Colonel A. M. Davies, seconded by Colonel D. Wardrop.

(5) The adoption of the Annual Report and Statement of Accounts for the year 1909 was moved from the Chair, seconded by Lieutenant-Colonel A. F. S. Clarke, and carried unanimously.

(6) On the motion of Colonel J. L. Notter, seconded by Colonel W. T. Martin, Messrs. Deloitte and Co., were appointed Auditors for the year 1910.

## SPECIAL GENERAL MEETING.

The Meeting was then constituted Special, for the consideration of a proposed amendment to Rule X., recommended by the Committee, which had been drafted by the legal advisers of the Society, and approved by the Actuary as in accordance with the Friendly Societies Act. The following resolution was moved from the Chair:—

"That Rule X. be rescinded and the following as amended be adopted in place thereof.

## Rule X.

"If it shall appear from the Report of the Actuary, appointed as Valuer under Rule XLVI., on the quinquennial valuation of the Assets and Liabilities of the Society, made under the provision of these Rules, that there was, at the date thereof, a surplus, after making provision for meeting all claims and contingencies, such part of such surplus as the Actuary advises can safely be distributed, may, on the recommendation of the Committee, be applied in such manner for the benefit of the members or their widows or orphan children as the members in General Meeting, in accordance with advice of the Actuary, may from time to time determine."

The Resolution, after some explanatory criticism, was carried unanimously.

A vote of thanks to the Chairman, proposed by Sir Charles Cuffe and seconded by Lieutenant-Colonel Davies, was carried unanimously, and the Meeting separated.

J. T. Clapham, *Captain*,  
*Secretary*.

NOTE.—The foregoing amendment was registered under the Friendly Societies Act, 1896, on June 4, 1910.

## REPORT OF THE ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND, INSTITUTED IN JANUARY, 1816.

SUBMITTED to, and adopted by, the Ninety-fifth Annual General Meeting, which was held at the Royal United Service Institution, Whitehall, S.W., on Tuesday, May 24, 1910, at 2.30 p.m.

Deputy-Surgeon-General W. G. Don, M.D., Vice-President in the Chair.

President.—Surgeon-General W. L. Gubbins, C.B., M.V.O., M.B., K.H.S., Director-General.

# ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

ACCOUNTS FOR THE YEAR 1908.

(In the form prescribed for the Annual Return of a Registered Friendly Society.)

## (A) BENEFIT FUND.

Dr.	INCOME.	£	s.	d.	Cr.	EXPENDITURE.	£	s.	d.
Contributions for Benefits—						Widows' Annuities (after deducting Income Tax) ..	3,488	4	1
Subscriptions for Widows' and Orphans' Fund .. ..	1,396 17 11	1,396	17	11		Income Tax on Annuities .. ..	215	6	5
Interest on Investments of Benefit Funds (less Tax deducted, £31 18s. 3d.) .. ..	.. ..	..	..	..		Interest on £4,316 12s. 9d. (balance of Management Fund at the end of the year 1908) at 3 per cent., transferred to Management Fund .. ..	129	10	0
Total Income .. ..	£6,048 4 11	6,048	4	11		Total Expenditure .. ..	£3,883	0	6
Amount of Benefit Fund at the beginning of the year as per last Balance Sheet .. ..	126,719 14 3	126,719	14	3		Amount of Benefit Fund at the end of the year as per Balance Sheet (C) .. ..	128,934	13	8
	£132,767 19 2	132,767	19	2			£132,767	19	2

## (B) MANAGEMENT FUND.

Dr.	INCOME.	£	s.	d.	Cr.	EXPENDITURE.	£	s.	d.
Interest for one year on £4,316 12s. 9d. at 3 per cent., transferred from Benefit Fund .. ..	129 10 0	129	10	0		Secretary's Salary .. ..	150	0	0
Management Fund at the beginning of the year as per last Balance Sheet .. ..	4,316 12 9	4,316	12	9		Office Allowance .. ..	60	0	0
						Printing, Stationery, Postages, &c. .. ..	15	0	1
						Actuary's Fee .. ..	21	0	0
						Auditor's Fee .. ..	10	10	0
						Total Expenditure .. ..	£256	10	1
						Amount of Management Fund at the end of the year as per Balance Sheet (C) .. ..	4,189	12	8
							£4,446	2	9

(C) BALANCE SHEET OF FUNDS AND EFFECTS, AS AT DECEMBER 31, 1909.

DR.			LIABILITIES.					
	£	s. d.		£	s. d.		Rate per cent. of interest yielded.	Or. £ s. d.
Total Benefit Fund, as per Account (A)	128,934	18 8						
Amount of Management Fund, as per Account (B)	4,169	12 8						
Other Liabilities—								
Income Tax deducted from Annuities .. .. .	215	6 5						
Secretary's Salary and Office Allowance (from October 1 to December 31, 1909) .. .. .	52	10 0						
Actuary's Fee .. .. .	21	0 0						
(1) With the Commissioners for the Redemption of the National Debt— Old Account, at 2½d. per cent. per diem .. .. .							3 16 0½	91,634 2 11
New Account, at 2d. per cent. per diem .. .. .							3 0 10	22,165 17 1
(2) In the Public Funds— Two and a Half per Cent. Consols .. .. .								
London and North-Western Railway Three per Cent. Debenture Stock Caledonian Railway Four per cent. Debenture Stock .. .. .								
Midland Railway Two and a Half per Cent. Debenture Stock .. .. .								
Three and a Half per Cent. East India Railway Debenture Stock .. .. .								
Note.—The Stock Exchange quotation on December 31, 1909, for the above Securities, costing £18,468 16s. 7d., amounted to £17,626 7s. 3d.								
Cash at Bankers .. .. .								
<b>Total</b>	<b>133,103</b>	<b>7 9</b>						

We have examined the above Balance Sheet and Accounts with the Books and Vouchers of the Society and certify that it is in accordance therewith. The Securities, and Cash Balances, have been verified by us.

5, London Wall Buildings,  
Finsbury Circus, London, E.C.  
April 13, 1910.

DELOITTE, PLENDER, GRIFFITHS & CO.  
*Chartered Accountants.*

*Vice-Presidents.*—Deputy-Surgeon-General C. A. Innes, M.D., Deputy-Surgeon-General W. G. Don, M.D., Surgeon-General W. S. M. Price.

*Trustees.*—Lieutenant-Colonel J. Martin, Lieutenant-Colonel J. Stevenson, M.D., Lieutenant-Colonel A. F. S. Clarke, M.D.

*Committee for 1910-11.*—Lieutenant-Colonel A. M. Davies, Lieutenant-Colonel M. W. Russell, Colonel J. Lane Nottter, M.D., Major E. L. McSheehy, M.D., Major W. H. Horrocks, M.B., Colonel D. Wardrop, C.V.O., M.B., Major C. E. Pollock, Surgeon-General Sir C. MacD. Cuffe, K.C.B., Brevet-Lieutenant-Colonel Sir W. B. Leishman, Knt., M.B., F.R.S.

*Auditors.*—Messrs. Deloitte, Plender, Griffiths & Co., Chartered Accountants.

*Consulting Actuary.*—H. W. Andras, Esq., F.I.A.

*Honorary Treasurer.*—Sir James R. D. McGrigor, Bart.

*Secretary.*—Captain J. T. Clapham, 20, Belgrave Road, Westminster, S.W.

# REPORT OF THE COMMITTEE TO THE MEMBERS OF THE ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

GENTLEMEN,—Your Committee have the honour to report on the affairs of the Society, and to submit the accounts for the year ended December 31, 1909.

On the advice of the Society's auditors, the old and new cash accounts, hitherto printed with those now produced, have been omitted as unnecessary. They advise that the statements "Benefit Fund" and "Management Fund," together with the Balance Sheet (these being the forms prescribed by Statute), give all the required information.

During the year the only changes in the investments of the Fund have been as follows:—

The sums of £3,417 1s. 2d. on the old account, and of £667 10s. 3d. on the new account (being interest on the amounts already invested with them), have been invested with the Commissioners for the reduction of the National Debt. The sums of £1,100 on the old account, and of £300 on the new account, have been withdrawn from the National Debt Commissioners for the payment of annuities.

[It should be explained for the information of new members that the terms "old account" and "new account," used above and in the Balance Sheet, refer to separate accounts, which have to be kept under these heads, for transactions with the National Debt Commissioners with regard to those members who joined the Society in different periods.]

The aggregate market value of the Stock Exchange securities will be found in a note on the face of the Balance Sheet. The difference between this market value and the book value will be dealt with at the next quinquennial valuation of the assets and liabilities of the Fund, which will take place at December 31, 1910.

Your Committee regret the resignation of Surgeon-General Sir Alfred Keogh, K.C.B., as President of the Society, and record their high sense of his services during his term of office. They also regret the resignation of Deputy-Surgeon-General Innes as Trustee, and thank him for his long services to the Society. The seats on the Committee vacant by the resignation of Surgeon-General Sir W. D. Wilson, K.C.M.G., and Colonel W. G. Macpherson, C.M.G., have been filled (under Rule XXVI.) by the election of Colonel D. Wardrop, C.V.O., and Major C. E. Pollock.

During the year 1909 fifteen members have joined the Society; (and eleven since the beginning of 1910). There have been six deaths among members and four withdrawals. Six annuitants have been added to the list and four have died; (one also has died in 1910).

On December 31, 1909, there were 131 members of the Society, of whom fifteen were unmarried. At the same date the annuitants numbered seventy-five.

Your Committee regard with satisfaction the considerable accession of new members. They will be obliged if members will continue to bring to the notice of their brother officers who have not yet joined the Society the advantages and strong financial position of the Fund.

W. G. Don, M.D., *Deputy-Surgeon-General, Vice-President,*  
*Chairman of the Meeting of this date.*

War Office,  
April 15, 1910.

*Note.*—Subscriptions should be paid to the Bankers of the Fund, Sir C. R. McGrigor, Bart., and Co., 25, Charles Street, St. James's Square, and not to the Secretary. From the latter may be obtained copies of the Rules, the Annual and Actuary's Reports, Forms of Declaration, &c.

## REPORT OF ANNUAL MEETING OF THE ROYAL ARMY MEDICAL CORPS' FUND.

The Annual Meeting was held at the Royal United Service Institution, Whitehall, S.W., on Monday, January 13, 1910, at 2.30 p.m., Surgeon-General W. J. Gubbins, C.B., M.V.O., K.H.S., Director-General, presiding.

The Chairman, in opening the proceedings, said: We are small in numbers this year, owing to the Corps Dinner having been cancelled on account of the death of His Majesty King Edward; consequently, there are not so many officers in town as there otherwise would have been. It has not been our custom to read the minutes of the previous annual meeting, but if any gentleman would like to make any remarks before they are confirmed, I shall be very glad to hear him. I will now deal with various points *seriatim*.

I will begin with the **Committee**. It undertakes, with the assistance of the Dinner and Memorial Sub-committees, the management of the Corps Funds, added to which it also manages and administers the General Relief and School Funds.

Since our last Annual Meeting we have reconstructed the constitution of the Committee. Questions frequently arise with regard to the management of the band, and it was found desirable to have the Band President a member of the Committee, but in order not to exceed the number of members originally decided on, viz., thirteen (nine officers on the active list and four representatives of retired officers), the Principal Medical Officer, Aldershot, agreed to the Band President taking his place on the Committee. It will, therefore, in future consist of the following members. The Director-General, the Principal Medical Officer London District, the Deputy-Director-General, a Professor of the Royal Army Medical College, an Officer Headquarters Staff, the Band President, the Commandant Royal Army Medical College, a junior Officer from Aldershot, a Quartermaster, Medical Stores, Woolwich, in addition to the four retired officers.

I will next take the **Accounts**. The finances of the Fund on June 1 stood as follows:—

	£ s. d.			
Current account (in bank)				
Royal Army Medical Corps Fund	..	..	1,199	17 3
General Relief Fund	..	..	365	8 11
School Fund..	..	..	90	15 6
Total	£1,656	1	8	

Besides this amount, £1,900 stands on deposit, including £1,000 for the Royal Army Medical Corps Fund, £200 for the General Relief Fund, and £700 for the School Fund; in addition, the General Relief has £1,100 invested in trust funds bringing our total assets to £4,656.

The **Subscribers**, I may remark, were 1,119 for the year 1909—the highest so far. Junior officers are now almost without exception joining the Fund, thanks to the lucid way in which its benefits are placed before them during the time they are at the College.

Coming now to the **Band**, quarterly grants amounting to £270 were voted by the Committee towards the expenses and upkeep of the band during the year 1909, as compared with £487 during the previous year, of which £130 was for the band room.

You will be pleased to learn that 233 officers attended the **Annual Dinner** last year, as compared with 215 in 1908. This year the Dinner Sub-committee consists of the following: Colonel A. Peterkin, Colonel Sir Jas. Clark, Bart., Deputy-Surgeon-General Don, Lieutenant-Colonel E. M. Wilson, Major C. B. Martin, Major H. A. Bray, Captain F. S. Irvine, Major Birrell (Hon. Sec.).

On May 12 a Special Meeting was held to cancel the Dinner this year owing to the lamented death of King Edward.

I will now invite your attention to the subject of **Memorials**.

Sir James McGrigor's statue has been removed to a suitable site at the College. Our thanks are very much due not only to our late Director-General, who initiated the idea, but to Sir George White, Governor of Chelsea Hospital, to Sir Schomberg McDonnell of the Office of Works, and lastly to Sir James McGrigor, the present baronet. They all met us in the most handsome manner, and put no obstacle whatever in the way.

Copies of portraits of Sir John Pringle, and Sir Andrew Smith, Director-General during the Crimean War, have been added; also an engraving "Remnant of an Army," has been placed in the College collection.

The Wolseley Memorial has, with the concurrence of Mrs. Wolseley, been transferred from the theatre, Royal Army Medical College, to the Netley Chapel, which is considered a more suitable place, whilst a stained glass window has been placed in the College Chapel to the memory of Captain Hardy, who, as you are aware, lost his life from sleeping sickness last year.

Dealing next with the **General Relief Fund**, I am glad to inform you that with very few exceptions all the companies sent grants to this Fund last year, amounting altogether to £368; £260 was spent in giving relief to individual cases, and subscriptions were paid to the following on behalf of the Corps: Union Jack Club, Corps of Commissioners, Soldiers and Sailors Help Association, Society for Employment of Reserve and Discharged Soldiers, Drummond Institute.

Hitherto the accounts of the Fund have been made up half yearly; it is now proposed to make them up *yearly*, as is done with the benevolent funds, and they will be published in the CORPS NEWS for February.

I will now touch on the question of **School Funds**. £143 was spent in maintaining children at schools last year. We are now maintaining ten children, and have thirteen educated free—making twenty-three in all. One more point in conclusion. Two years ago a resolution was passed that the meeting should vote a grant annually to the General Relief Fund, such grants to be based on the state of the finances at the time. Last year £10 was granted, and I may say that this is, with the exception of a few individual subscriptions, all that the officers of the Corps contribute to the Fund.

Now, gentlemen, before we proceed to item two on the Agenda, I wish to invite discussion on this statement I have just made.

Lieutenant-Colonel E. M. Wilson asked that the grant given to the General Relief Fund for the benefit of our discharged and reserve soldiers be increased from £10 to £50. He explained that he received a very large number of letters from discharged soldiers who would be very thankful to get to Canada, for instance, if any part of their passage could be paid, and, although he had been to the Canadian Offices, there was no likelihood of getting any assistance from them. Men often wrote and asked if any portion of their reserve pay could be advanced to enable them to emigrate, but of course we were not in a position to do this, and he thought if the grant be increased from £10 to £50 he could get into communication with reliable societies who arrange emigration, and he was sure it would be the means of keeping a good number of men out of the workhouse. The cost of getting from London to Toronto is £8.

Sir Alfred Keogh said he would be pleased to second the proposal, and it was carried unanimously.

Sir Charles Cuffe said he would like to ask a question as to whether the reports of the Society as published in the Journal were sent to non-subscribers to the Journal, or whether leaflets were forwarded to them.

The Secretary informed him, in reply, that the Committee reports are sent to the Committee, and the annual reports are published in the CORPS NEWS; a person who is not a subscriber does not get it, but he could buy it for 2d.

The Chairman said the next thing to determine was the most convenient place to hold the annual meetings—the Royal United Service Institution, for which they had to pay half a guinea, or the Royal Army Medical College. There was a good deal to be said for both places, and therefore he would be glad for an expression of opinion, as from the records nothing appeared to have been definitely decided on this point.

Sir Charles Cuffe thought the meeting should take place at the Royal Army Medical College as it gave the retired officers, especially, an opportunity of seeing the College. On being put to the meeting it was resolved *nem con* to hold the meetings in the Library of the Royal Army Medical College.

After a general discussion it was decided to form a sub-committee to consider and report on the erection of memorials in the Chapel and College, the sub-committee to consist of: Colonel D. Wardrop, C.V.O.; Colonel A. Peterkin; Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.

When the report was presented it was resolved that the Committee of the Royal Army Medical Corp Fund should have power to act.

Lieutenant-Colonel Skinner said that he would like to draw attention to the entertaining of distinguished guests at the College. He did not consider that the burden of the expense should be borne solely by officers residing in the College at the time, and by officers going through the College course of instruction. It had occurred to him that

it was hardly fair that such a limited number should carry out the duty of the whole Corps, but that all should take their part. The matter was brought up two years ago, and personally he thought that the whole of the Corps would be only too glad to come forward and help the College in carrying out a share of its social functions.

Lieutenant Colonel E. O. Wight said he would like to second Colonel Skinner's proposal, but he proposed to go a step further and start a fund which would not only defray the expenses of individual members who might be entertained, but also help members of the other outside messes to take some share of the burden borne by their institutions. He suggested that all officers who are not living in messes, and retired officers, should be invited to subscribe to a general entertainment fund to be managed by a committee.

Colonel Wardrop stated that he did not think the London Mess wanted money to entertain its guests, as the £50 given two years ago was almost entirely unspent. Maintenance was not charged up to the full extent allowed by King's Regulations because it would be a very heavy burden, but officers were charged a fair rate. He further explained that a lot of money would be wanted later on for upkeep and repairs; he also considered that we ought to have much better plate for the Mess.

Sir Charles Cuffe proposed that a committee be appointed to advise on the whole matter.

The Chairman said the Mess was in a flourishing condition and was very loyally supported, and everybody in the London District made a point of belonging to it, but Sir Charles Cuffe's suggestion as to forming a committee was a good one, and he submitted it for the consideration of the meeting.

It was then proposed by Sir Charles Cuffe and seconded by Lieutenant-Colonel James that a committee of five be formed, and that all the members be on the active list. This was carried and the following were appointed:—

Commandant Royal Army Medical College (Chairman).

Representatives of Woolwich, Aldershot, and Netley Messes.

A junior officer recently home from India.

Lieutenant-Colonel Blenkinsop to act as Secretary.

At the termination of business of the meeting the Chairman took the opportunity of giving a brief sketch of the CORPS JOURNAL both as to its finances and circulation.

## ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

PROCEEDINGS of the Annual General Meeting held at the Royal United Service Institution, on Monday, June 13, 1910, at 3.30 p.m.

Surgeon-General W. L. Gubbins, C.B., M.V.O., Director-General, Army Medical Service, in the chair.

(1) The Minutes of the last Annual Meeting were read and confirmed.

(2) The annual report and statement of accounts for the year 1909 were considered and passed, and are appended to these minutes.

(3) Surgeon-General W. Donovan, C.B.; Colonel J. Lane Nutter; Colonel Sir James Clark, C.B., Bart., were elected Vice-Presidents for the ensuing year.

(4) Colonel H. E. R. James and Major W. H. Horrocks were elected to fill vacancies on the Committee.

(5) It was resolved that the following grants recommended by the Committee be approved:—

### NAMES OF APPLICANTS FOR GRANTS RECOMMENDED BY THE COMMITTEE, 1910.

Three orphan daughters of Surgeon-General D. O. D.	...	...	£40	0	0
Orphan daughter of Inspector-General R. D.	...	...	30	0	0
Two orphan sons of Surgeon-Major C. Q.	...	...	30	0	0
Orphan son of Surgeon-Major C. T. C. (final)	...	...	20	0	0
Orphan daughter of Surgeon W. S. L. (final)	...	...	20	0	0
Orphan son of Lieutenant-Colonel R. W. T.	...	...	30	0	0
Orphan son of Brigade-Surgeon M. Q.	...	...	20	0	0

# ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

## STATEMENT OF ACCOUNTS FOR THE YEAR 1909.

RECEIPTS.		£	s.	d.	EXPENDITURE.		£	s.	d.
To Balance in hand, January 1, 1909	..	..	420	17	0	By Donations given by—	..	..	..
" Subscriptions	..	..	193	11	0	Annual General Meeting	..	..	515
" One Year's Dividends, 3 % Debenture Stock L.&N.W.	..	..	..	..	..	Committee	..	..	125
Railway (less tax £10 8s. 4d.)	..	..	189	11	10	Secretary	..	..	11
" One Year's Dividends, 3 % Debenture Stock N.E.	..	..	..	..	..	Secretary's Salary, September 30, 1908, to September 30, 1909	..	..	37
Railway (less tax £10 8s. 4d.)	..	..	189	11	4	" Clerical Assistance	..	..	26
" One Year's Dividends, 2½ % Debenture Stock Midland	..	..	151	13	4	" Bankers' Charges	..	..	0
" land Railway (less tax £8 6s. 8d.)	..	..	105	1	6	" Auditor	..	..	1
" One Year's Dividends, 4 % Debenture Stock Caledonian	..	..	10	4	11	" Printing	..	..	7
Railway (less tax £6 2s. 6d.)	..	..	34	2	6	" Postage	..	..	2
Dividends on £769 7s. 6d. Consols	..	..	5	0	0	" Stationery	..	..	2
Rebate on Income Tax	..	..	14	2	11	" Purchase of £300 Consols at 89½	..	..	250
Legacy from Colonel J. Wilson	..	..	..	..	..	" Stamps and Commission on above	..	..	0
" Officers' Mess, Middleburg, Donation	..	..	..	..	..	" Balance in Bank	..	..	340
			£1,919	16	4				17
									10
									4

INVESTMENTS.		£	s.	d.
L. & N.W. Railway 3 % Debenture Stock	..	6,667	0	0
Midland	..	6,400	0	0
N. Eastern	..	6,666	0	0
Caledonian	..	2,780	0	0
Consols, 2½ %	..	762	7	6
		£23,375	7	6

We have compared the above statement with the books and papers relating thereto, and certify that it is correct. We have verified the Bank balance and the Investment in Consols, and have inspected the Certificates of the Investments in Railway Stocks as set out.

Portland House,  
Basinball Street, E.C.  
January 7, 1910.

(Signed) EVANS, PIERSON & CO.  
Chartered Accountants.

Orphan daughter of Surgeon-General J. F. ...	£25	0	0
Orphan daughter of Inspector-General D. A. ...	30	0	0
And McGrigor's Pension ...	10	0	0
Two orphans of Lieutenant-Colonel H. W. A. M. ...	30	0	0
Four orphan daughters of Captain W. J. O. ...	40	0	0
Orphan daughter of Surgeon-General A. S. ...	10	0	0
Orphan daughter of Lieutenant-Colonel H. T. C. ...	20	0	0
Orphan daughter of Surgeon-General J. O. ...	25	0	0
Orphan daughter of Inspector-General W. F. T. I. ...	30	0	0
Two orphans of Surgeon-Major W. P. F. ...	40	0	0
Orphan daughter of Surgeon-General T. B. ...	25	0	0
Orphan daughter of Surgeon-Major B. S. ...	25	0	0
Orphan daughter of Captain H. H. S. ...	20	0	0
Orphan daughter of Captain J. W. C. ...	20	0	0
Orphan son of Brigade-Surgeon J. W. H. ...	30	0	0
Orphan son of Major P. G. I. ...	30	0	0
Total ...	£600	0	0

## ANNUAL REPORT, 1909.

The number of subscribers for the year was 175.

The receipts for the year amounted to £898 19s. 4d., and the expenditure to £978 18s. 6d.

Grants were made to twenty-five applicants, representing thirty-seven orphans.

A legacy of £5 was received from the executors of the late Colonel J. Wilson.

A donation of £14 2s. 11d. was received from the Officers, Middelburg.

£300 Consols at 83½ were purchased at an expenditure of £251 6s.

The value of the Society's investments on December 31, 1909, were as follows:—

£6,400	0	0	Midland Railway 2½ % Debenture Stock at 71 ..	£4,544	0	0
6,667	0	0	L. & N.W. „ 3 „ „ 88 ..	5,866	19	2
6,666	0	0	N.E. „ 3 „ „ 85 ..	5,666	2	0
2,780	0	0	Caledonian „ 4 „ „ 112 ..	3,113	12	0
762	7	6	Consols .. 2½ „ „ 83 ..	632	15	5
£23,275	7	6		£19,823	8	7

## LIST OF SUBSCRIBERS FOR 1909.

Archer, S. A., Major	£0	10	6
Avis, W. G., Lieutenant	1	1	0
Birrell, E. T. F. Major	1	0	0
Babbie, W., V.C., C.M.G., Colonel	1	0	0
Brodie, J. F., Colonel	1	0	0
Buist, J. M., Major	1	1	0
Battersby, J., Lieutenant-Colonel	1	0	0
Beach, T. B., Major	1	1	0
Bourke, G. D., C.B., Surgeon-General	1	1	0
Balck, C. A. J. A., Captain	1	1	0
Begbie, F. W., Major	1	1	0
Browne, W. W., Captain	1	1	0
Bousfield, L., Captain	1	1	0
Boyd, J. E. M., Lieutenant	1	1	0
Black, W. T., Dr.	1	1	0
Clarke, A. F. S., Lieutenant-Colonel	1	1	0
Comyn, J. S., Deputy-Surgeon-General	1	0	0
Campbell, J. H., Captain	1	1	0
Churchill, A. F., Surgeon-General	1	0	0
Cree, H. E., Lieutenant-Colonel	1	0	0
Cottell, A. B., Lieutenant-Colonel	1	1	0
Corker, T. M., Colonel	1	0	0
Chambers, A. J., Major	1	0	0
Cummins, S. L., Major	1	1	0
Cotton, F. W., Captain	1	1	0
Chopping, A. Captain	1	1	0

Churchill, G. B. T., Captain	...	...	...	...	...	£1	1	0
Cochrane, E. W. W., Captain	...	...	...	...	...	1	1	0
Cree, G., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Cuffe, Sir Charles, Surgeon-General, K.C.B.	...	...	...	...	...	1	1	0
Clapham J. T., Captain	...	...	...	...	...	1	1	0
Conner, J. C., Major	...	...	...	...	...	1	1	0
Copeland, R. J., Major	...	...	...	...	...	1	1	0
Chapman, F. H. H., Lieutenant	...	...	...	...	...	1	1	0
Clark, Sir James, Colonel, C.B., Bart.	...	...	...	...	...	1	1	0
Carruthers, V. T., Lieutenant	...	...	...	...	...	1	1	0
Casement, F., Lieutenant	...	...	...	...	...	1	1	0
Davies, A. M., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Dodd, J. R., Colonel	...	...	...	...	...	1	1	0
Davidson, A. E., Mrs.	...	...	...	...	...	1	0	0
Donovan, W., C.B., Surgeon-General	...	...	...	...	...	1	1	0
Evatt, J. G. H., C.B., Surgeon-General	...	...	...	...	...	1	0	0
Evans, P., Major	...	...	...	...	...	2	2	0
Elkington, H. P. J., Lieutenant-Colonel	...	...	...	...	...	1	0	0
Ellis, P. M., Surgeon-General	...	...	...	...	...	1	1	0
Elliott, A. C., Lieutenant	...	...	...	...	...	1	1	0
Fitzgerald, A. A., Major	...	...	...	...	...	1	1	0
Firth, R. H., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Foulds, F. M., Captain	...	...	...	...	...	1	1	0
Forrest, J., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Fletcher, H. J., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Payle, R. J., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Falchnie, N., Major	...	...	...	...	...	1	0	0
Giraud, C. H., Surgeon-Major-General	...	...	...	...	...	1	1	0
Girvin, J., Major	...	...	...	...	...	1	1	0
Green, J. S., M.B., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Gerrard, J. J., M.B., Major	...	...	...	...	...	1	0	0
Goggin, G. F., Colonel	...	...	...	...	...	1	0	0
Geddes, R. J., D.S.O., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Galwey, R. W., Lieutenant	...	...	...	...	...	1	1	0
Gatt, J. E. H., Captain	...	...	...	...	...	1	0	0
Gibson, H. G., Lieutenant	...	...	...	...	...	1	1	0
Hackett, R. J. D., Colonel	...	...	...	...	...	1	0	0
Hamerton, A. E., Captain	...	...	...	...	...	0	10	6
Hamilton, T. W. O'H., C.M.G., Lieutenant-Colonel	...	...	...	...	...	1	0	0
Hardy, W. E., Major	...	...	...	...	...	1	1	0
Herricks, H., Captain	...	...	...	...	...	1	1	0
Hall, R. H., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Hardy, F. H., Captain	...	...	...	...	...	1	1	0
Hassard, C. M., Major	...	...	...	...	...	1	1	0
Hughes, G. W. G., Captain	...	...	...	...	...	1	1	0
Holyoake, R., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Horrocks, W. H., Major	...	...	...	...	...	1	1	0
Harris, F. W. H. D., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Hodgson, J. E., Captain	...	...	...	...	...	1	1	0
Harwood, J. G., Colonel	...	...	...	...	...	1	1	0
Hayes, Mrs.	...	...	...	...	...	2	2	0
Innes, C. A., Deputy-Surgeon-General	...	...	...	...	...	1	1	0
Irwin, J. M., M.B., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Jennings, R., M.D., Lieutenant-Colonel	...	...	...	...	...	1	0	0
Johnston, W., M.D., C.B., Colonel	...	...	...	...	...	1	1	0
James, H. E. R., Colonel	...	...	...	...	...	1	1	0
Jackson, R. N. H., Major	...	...	...	...	...	1	1	0
Jones, F. W. C., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Jones, J. M., Colonel	...	...	...	...	...	1	1	0
Jameson, J. C., Major	...	...	...	...	...	1	0	0
Kirkpatrick, R., M.D., C.M.G., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Knox, M., Lieutenant-Colonel	...	...	...	...	...	1	0	0
Keogh, Sir A., K.C.B., Surgeon-General	...	...	...	...	...	1	1	0
Kenny, W., Surgeon-General	...	...	...	...	...	1	1	0

Kelly, W. D. C., Captain...	...	...	...	...	...	£1	1	0
Ligertwood, T., C.B., Colonel	...	...	...	...	...	1	1	0
Longmore, Lady	...	...	...	...	...	1	1	0
Lane, W. L., M.B., Lieutenant-Colonel	...	...	...	...	...	1	0	0
Leake, G. D. N., Colonel	...	...	...	...	...	1	1	0
Lelean, P. S., Captain	...	...	...	...	...	1	1	0
Long, W. N., Captain	...	...	...	...	...	1	1	0
Lunn, Wm. E. C., Lieutenant	...	...	...	...	...	1	1	0
Langrishe, J. du P., Lieutenant...	...	...	...	...	...	1	1	0
Loughman, W. F. M., Lieutenant	...	...	...	...	...	1	1	0
Martin, W. T., Colonel	...	...	...	...	...	1	1	0
McLaughton, A. M., Captain	...	...	...	...	...	1	1	0
Macpherson, W. G., C.M.G., Colonel	...	...	...	...	...	1	0	0
Moir, James, M.B., Major	...	...	...	...	...	1	0	0
Mould, W. T., Major	...	...	...	...	...	1	0	0
Murray, H. W., M.B., Colonel	...	...	...	...	...	1	1	0
McGill, H. S., Lieutenant-Colonel	...	...	...	...	...	1	1	0
May, W. A., C.B., Colonel	...	...	...	...	...	1	1	0
McNamara, W. H., C.B., Surgeon-General	...	...	...	...	...	1	1	0
McNeece, J. G., Surgeon-General	...	...	...	...	...	1	1	0
McSheehy, E. L., Major	...	...	...	...	...	1	1	0
Mangin, F. M., Major	...	...	...	...	...	1	0	0
McDougall, A. J., M.B., Captain	...	...	...	...	...	1	1	0
Mackenzie, T. C., D.S.O., Captain	...	...	...	...	...	1	1	0
MacLoughlin, G. S., M.B., D.S.O., Major	...	...	...	...	...	1	1	0
Macpherson, R. N., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Magrath, O. W. S., M.D., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Martin, C. B., Major	...	...	...	...	...	1	1	0
Moberly, H. J. R., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Morris, A. H., Captain	...	...	...	...	...	1	1	0
McEwen, O. R., Lieutenant	...	...	...	...	...	1	1	0
Mosse, C. G., Colonel	...	...	...	...	...	1	1	0
Mackenzie, D. F., Lieutenant	...	...	...	...	...	1	1	0
Maher, J., Lieutenant-Colonel	...	...	...	...	...	2	0	0
Myles, C. D., Captain	...	...	...	...	...	1	1	0
Notter, J. Lane, Colonel	...	...	...	...	...	1	0	0
Nickerson, G. S., Captain	...	...	...	...	...	1	1	0
Noke, F. H., Captain	...	...	...	...	...	1	1	0
Pocock, H. T., Major	...	...	...	...	...	1	0	0
Pollock, C. E., Major	...	...	...	...	...	1	1	0
Porter, F. J. W., D.S.O., Major	...	...	...	...	...	1	1	0
Profeit, C. W., Captain	...	...	...	...	...	1	1	0
Powell, J. E., Captain	...	...	...	...	...	1	1	0
Porter, R., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Poynder, G. F., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Paterson, Ian, Major	...	...	...	...	...	1	1	0
Phelan, E. C., Captain	...	...	...	...	...	1	1	0
Peterkin, A., Colonel	...	...	...	...	...	1	1	0
Risk, E. J. E., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Rowan, H. D., M.B., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Roe, S. B., C.B., Surgeon-General	...	...	...	...	...	1	1	0
Russell, M. W., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Rugg, G. F., Lieutenant	...	...	...	...	...	1	1	0
Reilly, C. C., Lieutenant-Colonel	...	...	...	...	...	1	0	0
Robinson, F. E. R., Captain	...	...	...	...	...	1	1	0
Sinclair, E. M., C.B., Deputy-Surgeon-General	...	...	...	...	...	2	2	0
Smithson, A. E., Major	...	...	...	...	...	1	1	0
Seymour, C., Colonel	...	...	...	...	...	1	1	0
Symons, J. T. M., Lieutenant-Colonel	...	...	...	...	...	2	0	0
Stallard, H. C. F., Captain	...	...	...	...	...	1	0	0
Sewell, E. P., Captain	...	...	...	...	...	1	1	0
Skinner, Bruce, M.V.O., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Sutton, A. A., D.S.O., Lieutenant-Colonel	...	...	...	...	...	1	1	0
Sloggett, A., C.M.G., Surgeon-General	...	...	...	...	...	1	0	0
Spencer, C. G., Major	...	...	...	...	...	1	1	0

Staddon, H. E., Major	...	...	...	...	...	£1	1	0
Steel, E. B., Major	...	...	...	...	...		1	0
Stephens, F. A., Captain	...	...	...	...	...		1	0
Swabey, M., Captain	...	...	...	...	...		1	0
Smith, S. Beylan, Captain	...	...	...	...	...		1	0
Stalkart, C. E. G., Major	...	...	...	...	...		1	0
Sim, J. A. B., Lieutenant	...	...	...	...	...		1	0
Trevor, T. W., C.B., Surgeon-General	...	...	...	...	...		1	0
Townsend, E., Sir, Surgeon-General	...	...	...	...	...		1	0
Tatham, C. J. W., Lieutenant-Colonel	...	...	...	...	...		1	0
Trevor, H. O., Lieutenant-Colonel	...	...	...	...	...		1	0
Thompson, W. I., Lieutenant	...	...	...	...	...		1	0
Windle, R. J., Lieutenant-Colonel	...	...	...	...	...		1	0
Wilson, J. B., M.D. Lieutenant-Colonel	...	...	...	...	...		1	0
Wilson, E. M., C.B., C.M.G., D.S.O., Lieutenant-Colonel	...	...	...	...	...		1	0
Wardrop, D., C.V.O., Colonel	...	...	...	...	...		1	0
Williamson, J. G., Lieutenant-Colonel	...	...	...	...	...		1	0
Woodhouse, T. P., Colonel	...	...	...	...	...		1	0
Woolfreyes, J. A., K.C.B., C.M.G., K.H.P., Surgeon-General	...	...	...	...	...		1	0
Whitehead, H. R., C.B., Surgeon-General	...	...	...	...	...		1	0
Waring, A. D., Captain	...	...	...	...	...		1	0
Watts, B., Captain	...	...	...	...	...		1	0
Weston, G. C., Lieutenant Colonel	...	...	...	...	...		1	0
Winder, M. G., Captain	...	...	...	...	...		1	0
Whippel, J. H. C., Colonel	...	...	...	...	...		1	0
Warren, L. Ethel, Miss	...	...	...	...	...		1	0
Weir, J. C. Major	...	...	...	...	...		1	0

## DEATHS.

**GREENE.**—At Woking, on June 4, 1910, **Honorary Brigade-Surgeon Hubert Rothwell Greene**, late Army Medical Department, aged 69. He entered the Service on September 30, 1863, served on the Staff in the 44th Foot, and in the Army Medical Department. He became Surgeon March 1, 1873; Surgeon-Major April 28, 1876; Surgeon-Lieutenant-Colonel September 30, 1883; and retired with the honorary rank of Brigade-Surgeon April 7, 1886. His war service was: Afghan War of 1871-80 (medal). Served in the Soudan Expedition under Sir Gerald Graham in 1884, and was present in the engagement at El Teb (mentioned in despatches, medal with clasp, and Khedive's Star), 2nd class of the Medjidie.

**FAUGHT.**—At Portsmouth, on June 13, **Surgeon-Major-General John George Faught, K.H.S.**, retired pay, aged 77. He entered the Service on January 5, 1855, served in the Royal Artillery, 46th Foot, and Army Medical Department. He became Surgeon November 9, 1867; Surgeon-Major March 1, 1873; Brigade-Surgeon, April 17, 1880; Deputy-Surgeon-General September 3, 1884; Surgeon-Major-General November 13, 1890; and retired on retired pay on December 15, 1892. His war service was: Ashanti War, 1874—Sanitary Officer at Cape Coast Castle; medal. Afghan War, 1878-1880, medal; Egyptian Expedition, 1882, medal, bronze star; Bechuanaland Expedition, 1884-5, as Principal Medical Officer, honourably mentioned; Operations in Zululand, 1888, as Principal Medical Officer.

## EXCHANGES, &c.

*The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.*

Field Officer due for India this Trooping Season wishes exchange to remain at home for a short period. "Phios," c/o Sir C. R. McGrigor, Bart., & Co., 25, Charles Street, St. James' Square, S.W.

Captain Rawe, due for abroad Trooping Season 1912-1913, wishes to exchange to India this Trooping Season. Address to "S.W.," c/o Messrs. Holt & Co., 3, Whitehall Place, London, S.W.

A free issue of twenty-five excerpts will be made to contributors of all articles classified under the heading of Original Communications, Lectures, Travels, and Proceedings of the United Services Medical Society.

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	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
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The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

**Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in March and September of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.**

**Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.**

**It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.**

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THE HON. MANAGER,

"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"

WAR OFFICE, WHITEHALL, S.W.

## Notices.

### EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

**All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.**

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S. W.

Communications have been received from Captain R. E. U. Newman, Captain B. B. Burke, Major F. J. W. Porter, Captain H. A. Bransbury, Lieutenant-Colonel F. H. Treherne, Major N. Faichnie, Captain J. H. R. Bond, Major C. E. Pollock, Serjeant E. B. Dewberry, Lieutenant J. du P. Langrishe, Lieutenant-Colonel H. F. R. James, Major W. B. Erskine, Captain W. H. Anderson, Major F. Smith, Colonel H. G. Hathaway.

The following publications have been received :—

*British : Medical Press and Circular, Proceedings of the Royal Society of Medicine, The Australian Medical Gazette, The Indian Medical Gazette, The Army and Navy Gazette, The Hospital, Guy's Hospital Gazette, The Lancet, The Royal Engineers' Journal, St. Bartholomew's Hospital Journal, The Practitioner, Red Cross and Ambulance News, Journal of the Royal Sanitary Institute, The St. Thomas's Hospital Gazette, The Shield, Public Health, The Medical Review, The Journal of Tropical Medicine and Hygiene, The Middlesex Hospital Journal, Journal of the Royal Institute of Public Health, Journal of the Royal United Service Institution, The Indian Medical Journal.*

*Foreign : Tidsskrift I Militær Hølsøvard, Archiv. f. Schiffs- und Tropen-Hygiene, Archives de Médecine Navale, Le Caducée, Société de Médecine Militaire Française, Revista de Sanidad Militar y La Medicina Militar Española, The Military Surgeon, Norsk Tidsskrift for Militærmedicin, Boletín de Sanidad Militar, Bulletin of The Johns Hopkins Hospital, Bulletin of the Manila Medical Society, Archives de L'Institut Pasteur de Tunis, Russian Journal, American Journal, Office International d'Hygiène Publique, Japanese Medical Journal.*

# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

## Corps News.

AUGUST, 1910.

### ARMY MEDICAL SERVICE.

Colonel Henry J. W. Barrow is placed on retired pay, dated July 7, 1910. Colonel Barrow entered the Service on September 30, 1871, as Staff-Assistant Surgeon; transferred to the 43rd Foot on August 14, 1872; became Surgeon A.M.D. March 1, 1873; Surgeon-Major September 30, 1883; Surgeon-Lieutenant-Colonel September 30, 1891; Brigade Surgeon-Lieutenant-Colonel A.M.S. May 7, 1896; and Colonel September 28, 1901.

His war service is: Soudan Expedition, 1885; Suakin. Medal with clasp, bronze star. Soudan 1885-6, Frontier Field Force; Action of Ginniss.

Lieutenant-Colonel Thomas J. O'Donnell, D.S.O., from the Royal Army Medical Corps, to be Colonel, *vice* H. J. W. Barrow, dated July 7, 1910.

### ROYAL ARMY MEDICAL CORPS.

Lieutenant Harold Bevis resigns his Commission, dated June 22, 1910.

Lieutenant-Colonel George J. Coates, M.D., half-pay list, retired on retired pay, dated June 25, 1910.

Lieutenant-Colonel Coates entered the Service on February 5, 1881; became Surgeon-Major February 5, 1893; Lieutenant-Colonel, February 5, 1901; was placed on the temporary half-pay list on account of ill-health on February 26, 1904; restored to the establishment March 13, 1906; selected for the higher rate of pay of his rank, December 29, 1905, and was again placed on temporary half-pay on account of ill-health on December 29, 1908.

His war service is: Bechuanaland Expedition, 1884-5. Tirrah, 1897-8. Medal with clasp. China, 1900. Served on Hospital Ship "Gwalior." Medal. South African War, 1902; operations in Cape Colony, May, 1902. Queen's medal with two clasps.

The undermentioned Quartermasters and Honorary Lieutenants are granted the honorary rank of Captain:—

Harry P. Wakefield, dated June 23, 1910.

Arthur Wheeler, dated June 23, 1910.

Quartermaster and Honorary Captain George H. Painton is placed on retired pay, dated July 5, 1910.

The King has been graciously pleased to give orders for the following appointments to the Most Honourable Order of the Bath:—

To be ordinary members of the Military Division of the Third Class, or Companions:—

Surgeon-General Arthur Thomas Sloggett, C.M.G., Principal Medical Officer, India.

Surgeon-General Owen Edward Pennefather Lloyd, V.C., Principal Medical Officer, South Africa.

Colonel Michael William Kerin.

The King has been pleased to give and grant unto Captain Leonard Bousfield, M.D., R.A.M.C., His Majesty's Royal licence and authority to accept and wear the Decoration of the Imperial Ottoman Order of the Medjidieh, Fourth Class, which has been con-

ferred on him by His Highness the Khedive of Egypt, authorised by His Imperial Majesty the Sultan of Turkey in recognition of valuable services rendered by him.

The King has been graciously pleased to approve of the honour of Knighthood being conferred on Surgeon-Lieutenant-Colonel Warren Roland Crooko-Lawless, C.I.E., M.D., Coldstream Guards, Surgeon to His Excellency the Viceroy of India.

**ROSTER FOR SERVICE ABROAD.**—The following exchanges have been approved : Lieutenant-Colonels G. E. Hale, D.S.O., and R. R. H. Moore ; C. T. Blackwell and R. H. Hall. Majors C. M. Floury and S. H. Fairie. Captains P. H. Henderson and R. Rutherford, W. J. Waters and H. G. Pinches, W. R. P. Goodwin and R. N. Woodley, F. W. W. Dawson and E. E. Parkes.

The name of the undermentioned officers have been added to the list of officers required to proceed abroad during the coming season : Major H. L. W. Norrington to Malta. Captains A. W. Gibson to Gibraltar ; E. E. Parkes to India.

The name of Major C. F. G. Stalkartt has been removed from the roster on his notifying his intention to retire.

**QUALIFICATIONS.**—Major G. S. Crawford has obtained the degree of M.D. of the Malta University.

**ARRIVALS HOME ON LEAVE.**—Colonels S. C. B. Robinson, W. G. Macpherson, C.M.G. ; Lieutenant-Colonel G. E. Faunce ; Major C. E. P. Fowler ; Captains J. M. Rahilly, A. G. Cummins, H. E. Gotelee, J. B. G. Mulligan.

**POSTINGS.**—The Lieutenants who terminated their course of probationary instruction at the end of June have been posted as follows : Lieutenants W. H. O'Riordan to Northern Command ; C. T. V. Benson and W. P. MacArthur to Aldershot Command ; E. M. Parsons Smith and L. C. Hayes to London District ; J. Gilmore to Southern Command ; C. Robb to Irish Command ; E. T. Gaunt to Eastern Command.

The Captains from the Senior Course at the Royal Army Medical College which terminated at the end of July have been posted as follows :—

*Northern Command.*—A. C. Adderley, H. J. Crossley, H. V. Bagshawe.

*Southern Command.*—C. D. Myles, W. L. Steele, M. C. Beatty, R. B. Ainsworth, R. Storis, J. E. H. Gatt, J. L. Jones.

*Eastern Command.*—W. C. Croly, F. E. Rowan-Robinson, J. H. R. Winder, A. W. Sampey, W. J. S. Harvey, A. H. Hayes, N. E. J. Harding, G. F. Rugg, C. Ryley, H. E. M. Douglas, V. C., D.S.O., J. P. T. Murphy, W. W. Browne.

*Western Command.*—J. F. Whelan, T. F. Ritchie.

*Aldershot Command.*—L. Cotterill, P. G. Easton, G. S. Wallace, G. A. K. H. Read.

*Scottish Command.*—F. A. H. Clarke, R. Rutherford.

*Irish Command.*—D. L. Harding, A. McMunn, W. F. Tyndale, C.M.G., J. M. H. Conway, W. D. C. Kelly, R. J. Franklin, F. W. W. Dawson, R. M. Ranking, T. S. Coates, D. Ahern, J. H. Duguid, A. T. Frost, C. R. Millar, P. Power, C. A. J. A. Balek.

*London District.*—H. W. Russell, E. S. Worthington, J. McKenzie, N. D. Walker.

**TRANSFERS.**—Quartermaster and Honorary Captain W. J. C. Talbot from Northern to Eastern Command for duty.

Quartermaster and Honorary Captain J. McClay from Eastern to Northern Command for duty.

Quartermaster and Honorary Captain H. J. P. Audus from Aldershot to Southern Command for duty.

Quartermaster and Honorary Captain H. W. Glover from Aldershot to Western Command for duty.

Quartermaster and Honorary Captain R. R. Cowan from Eastern to Aldershot Command for duty.

Quartermaster and Honorary Lieutenant A. Wheeler from Aldershot to Eastern Command for duty.

Quartermaster and Honorary Lieutenant J. Watkins from Western to Aldershot Command for duty.

Quartermaster and Honorary Lieutenant J. Gillman from Southern to Aldershot Command for duty.

**EMBARKATIONS.**—Major H. J. M. Buist, D.S.O., for South Africa ; Captain B. B. Burke, for West Coast of Africa ; Surgeon-General J. G. MacNeece, for India.

**HIGHER RATE OF PAY.**—The name of Lieutenant-Colonel J. J. C. Donnet should be substituted for that of Lieutenant-Colonel T. J. O'Donnell, D.S.O., in the Journal of July.

Lieutenant-Colonel H. M. Sloggett has been selected for increased pay from July 7, 1910.

**APPOINTMENTS.**—Captain R. M. Rankin has been appointed Specialist in Operative Surgery at Cork.

### RESULTS OF EXAMINATION OF MAJORS AND LIEUTENANTS, ROYAL ARMY MEDICAL CORPS.

The following results of examinations are notified for general information :—

Passed in Military Law for the rank of Lieutenant-Colonel: Major A. L. Scott (75 per cent.).

Captains: F. Ashe; L. W. Harrison, M.B. (75 per cent.); C. C. Cumming, M.B. (75 per cent.); J. F. Martin, M.B. (75 per cent.); C. S. Smith, M.B.; F. M. Parry, M.B.; D. O. Hyde, M.B. (75 per cent.); G. J. Houghton (75 per cent.); C. H. Carr, M.D.; F. W. Lambelle, M.B. (75 per cent.); H. Rogers, M.B.; M. G. Winder (75 per cent.).

Passed in Military Law for rank of Major: Captain S. E. Lewis, M.B.

Passed in (b) for rank of Captain: C. Clarke, M.B., F.R.C.S.; H. Gall; W. B. Purdon, M.B.; A. E. B. Jones, M.D.

Passed in (h) ii and iii for the rank of Captain: W. G. Wright, M.B.; A. T. J. McCreery, M.B.

Passed in (d) ii. for the rank of Captain: B. A. Odum; D. S. Buist, M.B.; A. M. Pollard; C. Clarke, M.B., F.R.C.S.; A. R. Wright, M.B. (75 per cent.); S. McK. Saunders; T. J. Mitchell, M.B.; F. H. Somers-Gardner, M.B.; G. S. Parkinson; H. Gall; C. H. O'Rorke, M.B.; J. Startin; C. G. Sherlock, M.D.; H. H. Lesson; S. W. Kyle, M.B.; J. W. Lane, M.D. (75 per cent.); W. G. Wright, M.B.; A. T. J. McCreery, M.B.

Passed in (h) for the rank of Captain: B. A. Odum; D. S. Buist, M.B.; A. M. Pollard; C. G. Collett, M.B.; C. Clarke, M.B., F.R.C.S.; A. R. Wright, M.B.; S. McK. Saunders; T. J. Mitchell, M.B. (80 per cent.); F. H. Somers-Gardner, M.B.; G. S. Parkinson; H. Gall; C. H. O'Rorke, M.B.; J. Startin; S. W. Kyle, M.B. (80 per cent.); J. W. Lane, M.D.

Passed in (h) i and ii for the rank of Captain: F. Worthington, M.B.

**NOTES FROM DEVONPORT.** Lieutenant and Quartermaster C. W. Kinsella, R.A.M.C., writes: "As a result of his inspection of the headquarters of No. 7 Company, Royal Army Medical Corps, and the Military Hospital, Devonport, held on May 6, Lieutenant-General Sir C. W. H. Douglas, G.O.C. in Chief, Southern Command, has been pleased to express his opinion 'that the organisation of the hospital is satisfactory, the men were well turned out on parade, the administrative arrangements appeared to be good, and he was pleased to observe that a thorough system had been arranged for both summer and winter training, and a very good syllabus arranged.' In commenting on the above, the Principal Medical Officer, Southern Command, adds, 'the very excellent report of the General Officer Commanding in Chief reflects great credit on all concerned.'"

"On June 18 a Review Order Parade of the Company was held to witness the presentation of the Medal for Long Service and Good Conduct to Corporal W. Whitson. In making the presentation, Lieutenant-Colonel R. J. Kirkpatrick, C.M.G., O.C., congratulated the recipient on his meriting this much-coveted decoration.

"Lieutenant F. Gilmour has joined from Aldershot for duty."

**NOTES FROM DUBLIN.**—Serjeant C. B. Dewberry was successful at the recent examination for Meat and Food Inspector held under the Royal Institute of Public Health, London, and Local Government Board, Dublin.

**NOTES FROM MIDDELBURG.**—Captain W. H. Forsyth writes under date June 25, 1910: "Since the middle of September, 1909, the Military Hospital has been reduced to six beds, and moved from the Royal Army Medical Corps kopje down to the Cavalry Lines.

"The middle of July will probably finish the medical part of the camp, and by September khaki will be an unknown colour in this part of the Karoo.

"Luckily for the town the Agricultural Department has taken over the Government

Farm and many of the Bungalows, to establish an Agricultural College—so the town is saved from degenerating into its previous state of "dorpdom"—to the relief of the tradespeople. All but the permanent buildings have been taken down, and the place, in consequence, looks barer and grander than ever.

"The various crests on the kopjes are almost obliterated by the rains.  
 "There will, I am sure, be many who will mourn the death of Middelburg."

**NOTES FROM SIMLA.**—Lieutenant-Colonel R. S. F. Henderson, R.A.M.C., Secretary to Principal Medical Officer, His Majesty's Forces in India, writes under date June 16, 1910:—

**"Examination.**—Following officers have passed in the subjects noted: Major L. F. Smith, M.B., technical subjects; Captain A. M. Benett (*d*) *ii* and in (*h*) *ii* and *iii*; Lieutenant O. C. P. Cooke (*d*) *ii*; Lieutenant C. H. Denyer (*d*) *ii*; Lieutenant H. W. Farebrother (*h*) *ii* and *iii*; Lieutenant T. McC. Phillips, M.B. (*d*) *ii* and in (*h*) *ii* and *iii*; Lieutenant H. W. Carson, M.B. (*d*) *ii* and in (*h*) *ii* and *iii*; Lieutenant F. I. Dowling, M.B. (*d*) *ii* and in (*h*) *ii* and *iii*; Lieutenant R. F. O'T. Dickinson (*d*) *ii* and in (*h*) *iii*; Lieutenant C. P. O'Brien-Butler (*h*) *ii* and *iii*; Lieutenant J. R. Lloyd (*d*) *ii* and in (*h*) *ii* and *iii*; Lieutenant H. H. Blake, M.B. (*d*) *ii* and in (*h*) *ii* and *iii*.

**"Specialists.**—The following officers are appointed specialists in the subjects named, with effect from the dates noted against them:—

**"(b) Dermatology.**—Captain G. H. Stevenson, 3rd (Lahore) Division, from April 1, 1919; Lieutenant H. P. Hart, Burma Division, from April 1, 1910.

**"(h) Midwifery and Diseases of Women and Children.**—Major E. M. Williams, 8th (Lucknow) Division, from May 17, 1910.

**"Prevention of Disease.**—Lieutenant J. W. Houston-Belgaum, from June 2, 1910."

15955 Serjeant H. G. Miller has been selected for duty with the Medical Department of Northern Nigeria.

10675 Staff-Serjeant W. Richardson has been granted an extension of two years with the Transvaal Volunteers.

**DISCHARGES.**—7479 Staff-Serjeant A. F. Ovens, June 24, 1910, after three months' notice; 7355 Staff-Serjeant J. H. H. Rothery, June 30, 1910, after three months' notice; 8439 Serjeant E. B. Snowden, June 27, 1910, termination of second period; 5551 Serjeant H. Hart, June 30, 1910, after three months' notice; 5513 Staff-Serjeant G. C. Young, July 4, 1910, after three months' notice; 19635 Staff-Serjeant J. O'Connor, July 14, 1910, termination of engagement; 18210 Corporal M. Love, July 14, 1910, after eighteen years' service; 12755 Private W. Meredith, June 23, 1910, termination of first period; 2111 Private S. J. Sullivan, July 4, 1910, on payment of £18.

**TRANSFERS TO ARMY RESERVE.**—1113 Private W. Hardy, June 12, 1910; 17720 Private G. B. Bourne, June 19, 1910; 17779 Private D. McAuliffe, June 22, 1910; 17942 Lance-Corporal J. Taylor, June 24, 1910; 147 Private W. Lintott, June 24, 1910; 17778 Private J. Magill, June 22, 1910; 17724 Private G. R. Hyde, June 27, 1910; 1115 Private W. Beasley, July 1, 1910; 1114 Private G. Shaw, June 30, 1910; 1117 Private W. Waddington, July 8, 1910; 18585 Private F. Mills, June 11, 1910; 17747 Private F. J. Vine, July 9, 1910; 17746 Private D. F. Reynolds, July 7, 1910.

**TRANSFERS TO OTHER CORPS.**—1392 Private J. Duggan, June 13, 1910, to 5th Lancers; 11896 Serjeant A. P. Spackman, June 18, 1910, to Egyptian Army; 8564 Staff-Serjeant G. A. Howell, June 22, 1910, to Territorial Forces; 9375 Staff-Serjeant W. Allford, June 22, 1910, to Territorial Forces; 10074 Staff-Serjeant H. Wilkins, June 27, 1910, to Territorial Forces; 11812 Serjeant W. C. Banks, June 28, 1910, to Territorial Forces; 4577 Private W. Flood, July 6, 1910, to S. Lancashire Regiment.

#### THE FOLLOWING N.C.O.'s AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS:—

**For Quartermaster-Serjeant.**—10510 Staff-Serjeant W. T. Eldergill, 10922 Staff-Serjeant H. Robinson.

**For Staff-Serjeant.**—10511 Serjeant F. Morgan, 16053 Serjeant S. M. Gawthorne, 9305 Serjeant H. Maffey, 8903 Serjeant J. Robson, 10127 Serjeant E. Lishmund, 18801 Serjeant G. H. Wolfe.

**For Serjeant.**—16247 Corporal E. S. Freeman, 18969 Corporal E. Gray, 14761 Corporal W. Robertson, 11405 Lance-Serjeant W. Scott, 9975 Corporal J. E. Partridge.

**For Corporal.**—16299 Private E. P. Plunkett, 19496 Private H. Pettit, 19630 Private A. Taylor, 4352 Private C. Henry, 11951 Private T. J. Hoodless, 18427 Private P. Barber, 19037 Private W. B. Thomas, 26, Private F. Bax, 19429 Private R. Orton,

19788 Private W. J. Clayden, 2148 Private J. Ashcroft, 2195 Private S. E. Snape, 4307 Private H. Hayes, 4351 Private H. W. Gibson, 12751 Private T. B. Carter, 18329 Private F. G. Davidson, 19979 Private G. E. Thain.

*Passed as Dispensers.*—17542 Corporal R. Colgan, 17870 Lance-Corporal E. Cragg, 18222 Corporal A. Dady, 18447 Lance-Corporal J. E. Pakes, 12428 Corporal F. J. Ferguson, 12038 Corporal J. H. Garlick, 2046 Private F. J. Hammond, 18717 Corporal C. H. Hart, 18893 Private J. Hazell, 15648 Corporal E. J. Hill, 16949 Lance-Corporal G. Ireland, 17736 Corporal J. D. Keeble, 19814 Corporal P. Kenneally, 12768 Corporal T. R. Kent, 19291 Private G. Lauraine, 17541 Corporal P. McConn, 17091 Corporal J. Moore, 17521 Corporal H. G. Parsons, 9975 Corporal J. E. Partridge, 18977 Corporal C. M. Pickup, 18259 Lance-Corporal W. T. Roden, 18340 Lance-Corporal J. Rouse, 291 Private W. J. Scovey, 14356 Corporal W. L. Vyse, 8770 Corporal R. Wilson, 14686 Corporal W. A. Wilson, 19453 Private A. C. Wingate, 17926 Corporal J. F. Winter, 18335 Lance-Corporal W. J. Woolway, 15610 Corporal L. H. Griggs, 12265 Corporal A. G. Turpin, 14210 Corporal J. Fulton, 18213 Corporal W. C. Pacey, 19193 Private W. M. Stebbings, 10955 Corporal J. H. Rowe, 17977 Lance-Corporal D. Davis, 19508 Private E. Fenton, 10336 Corporal F. J. Howell, 11784 Corporal A. H. O. Champion.

### SPECIAL RESERVE OF OFFICERS.

#### ROYAL ARMY MEDICAL CORPS.

Cadet Colour-Serjeant Thome - Lindsay, from the Edinburgh University Contingent Officers' Training Corps, to be Lieutenant (on probation) dated May 12, 1910.

The undermentioned officers from the Unattached List, Territorial Force, and the Edinburgh Contingent, Officers' Training Corps, to be Lieutenants (on probation), dated August 11, 1909: Captain William Darling, M.B.; Captain John May Darling, M.B.; Paul Bernard Roth, M.B., to be Lieutenant (on probation), dated May 28, 1910.

The undermentioned to be Lieutenants (on probation): Claude Johnson, M.B., dated May 25, 1910; John Ronald Rigden Trist, dated May 30, 1910; Thomas Alexander Weston, dated May 31, 1910.

### TERRITORIAL FORCE.

#### ROYAL FIELD ARTILLERY.

2nd West Riding Brigade.—Supernumerary Surgeon-Captain John C. Wright, M.B., is restored to the establishment, dated January 17, 1910.

#### ROYAL GARRISON ARTILLERY.

Tynemouth.—Surgeon-Major Hugh R. Bramwell, M.B., resigns his commission, dated July 6, 1910.

#### ROYAL ENGINEERS.

Lancashire (Fortress).—Surgeon-Captain John Wesley Lloyd to be Surgeon-Major, dated April 1, 1908.

Surgeon-Lieutenant John Owen to be Surgeon-Captain, dated October 5, 1908.

#### INFANTRY.

4th Battalion, The King's Own (Royal Lancaster Regiment).—Surgeon-Captain and Honorary Surgeon-Major Richard J. Morris resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated July 6, 1910.

5th (Prince of Wales's) Battalion, The Devonshire Regiment.—Surgeon-Lieutenant Walter Chapman resigns his commission, dated July 6, 1910.

4th (Denbighshire) Battalion, The Royal Welsh Fusiliers.—Surgeon-Lieutenant Jonas W. Anderson, M.B., to be Surgeon-Captain, dated June 1, 1910.

5th Battalion, The York and Lancaster Regiment.—Surgeon-Lieutenant Harold F. Horne to be Surgeon-Captain, dated May 6, 1910.

#### ROYAL ARMY MEDICAL CORPS.

3rd East Anglian Field Ambulance.—William Ignatius Cowell to be Lieutenant, dated May 10, 1910.

3rd Lowland Field Ambulance.—Quartermaster and Honorary Captain Philip Macintosh, retired pay (late Royal Army Medical Corps), to be Quartermaster, with the honorary rank of captain, dated October 12, 1909.

Eastern Mounted Brigade Field Ambulance.—Supernumerary Lieutenant Meredith S. Double is restored to the establishment, dated March 1, 1910.

1st Highland Field Ambulance.—Major Francis Kelly, M.D., from the 2nd Highland Field Ambulance, Royal Army Medical Corps, to be Lieutenant-Colonel, dated May 22, 1910.

*5th Southern General Hospital.*—Major Bonner H. Mumby to be Lieutenant-Colonel, dated June 25, 1910.

*1st North Midland Field Ambulance.*—Quartermaster and Honorary Lieutenant William M. Moreton is granted the honorary rank of Major, dated May 21, 1910.

*2nd North Midland Field Ambulance.*—Captain Alastair MacGregor resigns his commission, dated July 2, 1910.

*3rd East Anglian Field Ambulance.*—Major and Honorary Surgeon-Lieutenant-Colonel Harry Thornton Challis, M.D., takes precedence next above Major Josiah Oldfield, M.D.

*2nd North Midland Field Ambulance.*—Quartermaster and Honorary Lieutenant Thomas Spibey is granted the honorary rank of Captain, dated November 1, 1909.

*2nd Northern General Hospital.*—Leonard Ralph Braithwaite, M.B., F.R.C.S. (Eng.), to be Captain, whose services will be available on mobilization, dated May 1, 1910.

*3rd East Anglian Field Ambulance.*—Quartermaster and Honorary Lieutenant Leslie H. Beaumont to be Transport Officer, with the honorary rank of Lieutenant, dated June 6, 1910.

*1st Highland Field Ambulance.*—Alfred Alexander Prosser to be Quartermaster, with the honorary rank of Lieutenant, dated May 1, 1910.

*2nd Western General Hospital.*—Archibald Donald, M.D., to be Captain, whose services will be available on mobilization, dated March 6, 1910.

George Redmayne Murray, M.D., to be Captain, whose services will be available on mobilization, dated March 7, 1910.

*Attached to Units other than Medical Units.*

James Taylor Rogers MacGill, M.B., to be Lieutenant, dated March 23, 1910.

Edmund Litchfield Anderson, M.B. (late Lieutenant, 9th Battalion, The King's (Liverpool Regiment)), to be Captain, dated April 7, 1910.

John Graham, M.B., to be Lieutenant, dated May 7, 1910.

John Goss to be Lieutenant, dated May 10, 1910.

Surgeon-Major Harry Poole Berry, M.B., from the 4th Battalion, The Lincolnshire Regiment, to be Major, with precedence as from September 13, 1902, dated June 25, 1910.

*Attached to Units other than Medical Units.*

Lieutenant Antony A. Martin, M.D., to be Captain, dated October 10, 1909.

Captain Herbert S. Oliver to be Major, dated February 24, 1910.

Lieutenant John M. Bowie, M.D., to be Captain, dated May 1, 1910.

Captain David M. Macdonald, M.D., resigns his commission, dated June 25, 1910.

Captain John F. Crombie to be Major, dated May 26, 1910.

Captain Robert Raunie, M.B., to be Major, dated June 1, 1910.

Lieutenant John B. Rous resigns his commission, dated July 13, 1910.

UNATTACHED LIST FOR THE TERRITORIAL FORCE.

Percival Templeton Crymble, M.B., F.R.C.S. (Eng.), to be Lieutenant, for service with the Medical Unit of the Belfast University Contingent, Senior Division, Officers' Training Corps, dated May 19, 1910.

*For duty with Units other than Medical Units.*

Arthur Hill Burnett to be Lieutenant, dated June 1, 1910.

Percy Luke Armstrong, M.B., to be Lieutenant, dated June 3, 1910.

Alfred Sigismund Bruzand to be Lieutenant, dated June 4, 1910.

Colonel Andrew Clark, F.R.C.S., Administrative Medical Officer, 2nd London Territorial Division, to be Honorary Surgeon to the King.

Colonel Joseph W. Blandford, Administrative Medical Officer, Northumbrian Territorial Division, to be Honorary Physician to the King.

**RESULTS OF THE EXAMINATION OF MAJORS, R.A.M.C. (T.F.).**

Passed in Technical Subjects for the rank of Lieutenant-Colonel: S. S. J. Kirby, M.D., 2nd East Anglian Divisional, Field Ambulance; G. A. Edsell, M.D., 3rd Home Counties, Field Ambulance; Hon. Lieutenant-Colonel H. T. Challis, M.D., attached to East Anglian Divisional Transport and Supply, Army Service Corps; H. H. C. Dent, M.B., F.R.C.S., 3rd North Midland, Field Ambulance (86 per cent. in Med. Organ. of

T.F., 89 per cent. in Laws and Customs of War); W. K. Clayton, Yorkshire Mounted Brigade, Field Ambulance; T. Forrest. M.B., attached 7th Scottish Rifles; Lieutenant-Colonel R. T. Halliday, M.B., Lowland Mounted Brigade, Field Ambulance (84 per cent. in Med. Organ. of T.F., 95 per cent. in Laws and Customs of War); H. W. Thomson, M.B., Lowland Mounted Brigade, Field Ambulance (81 per cent. in Med. Organ. of T.F.); J. McKie, M.B., 2nd Lowland, Field Ambulance (89 per cent. in Laws and Customs of War); T. Stevenson, M.B., 2nd West Lancashire, Field Ambulance; W. B. Cockill, M.D., 3rd West Lancashire, Field Ambulance (81 per cent. in Med. Organ. of T.F.).

**NOTES FROM THE NORTH MIDLAND DIVISION, T.F.**—Captain E. Bennett, R.A.M.C., writes: "A very interesting and instructive tactical exercise for medical officers of the district, which was drawn up by Colonel R. H. Luce, V.D., Administrative Medical Officer of the North Midland Division T.F., was held on June 26, at Loughborough. Nineteen officers in all were present, having come from Leicester, Derby and Nottingham in motor cars. The place of assembly was the Bull's Head Hotel, Loughborough, at 2 p.m. On assembly the Administrative Medical Officer briefly described the scheme, copies of which had been sent previously to all officers. All orders were issued in the scheme with the exception of the medical arrangements which were left blank to be filled in by officers who had been appointed Administrative Medical Officers of Divisions and Officers Commanding Field Ambulances and Mounted Brigade Field Ambulances. Officers then went off in parties by motors to the different positions which their respective Divisions were occupying, and made arrangements for the position of their dressing stations and for the evacuation of the wounded from the field.

"Two officers were detailed to make all arrangements for the embarkation of the wounded at Loughborough Station, whence they would be evacuated to Derby via railway and canal.

"After inspecting the ground and completing their orders all officers reassembled at the Bull's Head at 5 p.m. for tea, after which the various officers read out their arrangements and orders to the Administrative Medical Officer, who criticised them.

"Officers were, before leaving, directed to send their arrangements and orders fully completed to the Administrative Medical Officer

"Ordnance maps (2 inches to 1 mile) and compasses were carried by officers."

### **QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.**

The following ladies have received appointments as Staff-Nurses. Miss J. L. Bentley, Miss M. C. Corbishley.

*Postings and Transfers.*—Sisters: Miss W. Potter, to Edinburgh, from Chatham; Miss E. M. Fairchild, to Bloemfontein, from Wynberg; Miss C. G. Stronach, to Chatham, from Netley; Miss J. W. Wilson, to Netley, from Edinburgh; Miss J. Murphy, to London, from Edinburgh. Miss E. St. Quintin, to Dublin, from Netley; Miss E. J. M. Keene, to Netley, from Dublin. Staff-Nurses: Miss E. A. R. Yockney, to Edinburgh, from London; Miss J. L. Blakely, to Cambridge Hospital, Aldershot, on appointment; Miss G. L. Bentley, to London, on appointment; Miss M. C. Corbishley, to Netley, on appointment.

## **ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.**

PROCEEDINGS of a Committee Meeting held at the War Office, at 3.30 p.m., on Monday, April 18, 1910.

*Present.* \*

Surgeon-General W. L. Gubbins, C.B., M.V.O., Director-General, in the Chair.

Colonel D. Wardrop, C.V.O.

Colonel A. Peterkin.

Lieutenant E. M. Wilson, C.B., C.M.G., D.S.O.

Major C. G. Spencer.

Major E. T. F. Birrell.

(1) The Minutes of the last Meeting were read and confirmed.

(2) The case of Mrs. A. E. C., the wife of Major C., was considered, and it was resolved that she is, under the rules of the Society, ineligible for a grant.

(3) The case of Mrs. J. M. C. W. was reconsidered, and it was resolved, as previously stated, that the Committee could make no further grant to her.

(4) It was resolved that the sum of £105 8s., being legacies from Colonel J. Wilson and Surgeon General J. Monat, V.C., be invested in Consols.

(5) It was resolved that Lieutenant-Colonel F. W. H. Davie-Harris be re appointed as Secretary for one year, viz., until December 31, 1911.

(6) It was proposed and carried unanimously that the Secretary's salary be raised to £100 per annum with effect from the 1st instant, also that the question of an office allowance be considered when the necessity arises

F. W. H. DAVIE HARRIS.

## ROYAL ARMY MEDICAL CORPS FUND.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON MONDAY  
APRIL 18, 1910.

*Present.*

Surgeon-General W. L. Gubbins, C.B., M V.O., Chairman, in the Chair.

Surgeon-General W. Donovan, C.B.

Surgeon-General W. Babbie, V.C., C M.G.

Colonel D. Wardrop, C.V.O.

Colonel A. Peterkin.

Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.

Lieutenant-Colonel E. O. Wight.

Major C. G. Spencer.

Major E. T. F. Birrell.

Major A. G. F. Stallard took his seat on the Committee.

(1) The Minutes of the last meeting were read and confirmed.

(2) *Memorials.*—(a) The sum of £20 was sanctioned for the Memorial wreath for his late Majesty, £15 from the Royal Army Medical Corps Fund, and £5 from the General Relief Fund. The Chairman informed the meeting that a letter of thanks had been received from Queen Alexandra in her own handwriting.

(b) An extra £5 was sanctioned for the stained glass window to the memory of the late Captain Hardy.

(c) The Sub-Committee of the Royal Army Medical Corps appointed to enquire into the advisability or otherwise of erecting a memorial met on July 5, and having discussed the question, is of opinion that it is not desirable for the Royal Army Medical Corps to take any action as regards the erection of the Memorial referred to at the Annual General Meeting of the Fund on July 13.

(3) *Band.* The Aldershot Band Accounts were examined and passed, and are appended to these Minutes. A sum of £73 was voted for the current quarter's expenses. It was proposed by Lieutenant-Colonel E. M. Wilson, seconded by Major Birrell and carried, that the expenditure caused by the travelling expenses of a portion of the Band to play at the Annual Meeting of the Army and Navy Male Nurses Co-operation and Reception held at the Grafton Gallery on July 25, be sanctioned to the extent of £5 10s. and that the Band President may be authorised to pay this amount.

(4) *General Relief.*—It was noted that the following amounts had been received for the General Relief Fund for the last quarter —

No. 12 Company Woolwich ..	..	..	..	£2 10 0
„ 14 „ Dublin ..	..	..	..	7 10 0
„ 17 „ Curragh ..	..	..	..	5 0 0
„ 2a „ Bloemfontein ..	..	..	..	15 0 0
„ 31 „ Mauritius ..	..	..	..	3 0 0
Royal Army Medical Corps Fund ..	..	..	..	50 0 0
				<hr/>
				£83 0 0

(5) The expenditure on General Relief for the quarter ending June 30 was confirmed and a list of recipients is attached hereto.

(6) A letter was read from Lieutenant-Colonel R. Caldwell suggesting that the Corps should become subscribers to the Brompton Hospital, with the object of being eligible to nominate an in-patient. The Secretary informed the Committee that for £5 the Royal Army Medical Corps Fund could become a Governor. It was resolved to subscribe one year from the General Relief Fund.

(7) It was resolved to continue the subscription of £5 to the Drummond Institute from the School Fund for one year.

(8) It was resolved that Lieutenant-Colonel F. W. H. Davie Harris be re-appointed as Secretary for one year until December 31, 1911.

(9) It was proposed and carried unanimously that the Secretary's salary be raised to £100 per annum with effect from the 1st instant, also that the question of an office allowance be considered when the necessity arises.

F. W. H. DAVIE HARRIS,  
Lieutenant-Colonel,  
Secretary.

# ROYAL ARMY MEDICAL CORPS BAND ACCOUNTS.

FOR QUARTER ENDING JUNE 30, 1910.

RECEIPTS.			EXPENDITURE.		
	£	s. d.		£	s. d.
April 12. Balance Credit .. .. .	3	7 10	Bandmaster's Salary for Quarter	..	30 0 0
Gratuities and Fares, R.A.M. College, March 3, 15, and 29 .. .. .	..	..	Band Pay .. .. .	..	.. 43 17 0
14. Officers' (Aldershot) Subscriptions for March .. .. .	11	4 5	May 5. Taylor and Co., Electric Lighting of Band Practice Room, exclusive of ground cable..	..	.. 9 18 0
21. Grant from R.A.M.C. Fund .. .. .	100	0 0	June 8. Recruiter's Fee for Bandsman..	..	.. 0 5 0
29. Gratuity for playing at Gymnasium .. .. .	2	0 0	" 22. Boosey and Co., New Euphonium, Repairs ..	..	25 1 8
May 1. Sale of Old Instruments .. .. .	0	16 0	" " Hawkes and Son, Music and Repairs ..	..	7 0 11
15. Officers' (Aldershot) Subscriptions for April..	5	0 0	" " Master Tailor, alteration of Tunics ..	..	5 3 3
June 15. " " May .. .. .	6	12 6	" 28. Small Repairs .. .. .	..	.. 0 2 3
Forty-five Officers' Subscriptions at 5s. .. .. .	11	5 0	Balance Credit .. .. .	..	22 16 10
	£145	5 9			£145 5 9

Aldershot.

August 3, 1910.

H. G. F. STALLARD, Major R.A.M.C.,  
Band President.

## ROYAL ARMY MEDICAL CORPS FUND.

RECIPIENTS FROM THE GENERAL RELIEF FUND FOR THE QUARTER ENDING  
JUNE 30, 1910.

Name	Age	District	Grant	Total	Remarks
Mrs. M. S. ..	40½	Aldershot..	£4	£13	Has a large family to support, and is unsuccessful in obtaining work.
Mrs. Mc. C. ..	34	Dublin ..	£4	£12	Three young children to support.
Mr. W. W. D... ..	31	Aldershot..	£4	£4	Suffers from tubercle. Unable to work.
Mrs. F. E. P. ..	43	Portsmouth	£3 12s.	£17 12s.	Suffers from bronchitis, and unable to support herself.
Mrs. S. B. ..	52	"	£3	£3	In delicate health and poor circumstances. One child to support.
Mr. W. K. ..	33	Aldershot..	£2	£2	Ill-health and out of work.
Mr. G. R. G. ..	40	" ..	£4	£14	Cannot work; almost blind. Wife is an invalid.
Mrs. E. L. P. ..	34	London ..	£4	£8	No visible means of subsistence; trying to obtain work.
Mrs. M. I. ..	66	Dublin ..	£1	£83	Extreme poverty.
Mr. W. B. B. S.	22	" ..	£4	£4	Suffers from heart affection. Unable to work.
Mr. H. S. ..	45	Woolwich..	£2	£2 10s.	Destitute and out of work.
Mr. G. T. C. ..	23	London ..	£1	£1	"
Mr. W. F. N. ..	48	Woolwich..	£2	£10	Suffers from "ill-health." Two children to support.
Mrs. A. L. ..	51	Belfast ..	£4	£10	Suffers from ill-health and is nearly blind.
Mrs. F. M. S. ..	27	Dublin ..	£4	£4	Three young children to support.
Mr. J. W. ..	..	York ..	£4	£4	Suffers from tuberculosis.
Mrs. E. H. ..	53	London ..	£4	£8	Suffers from ill-health.
Mrs. E. M. W.	39	Aldershot..	£3	£7 10s.	Special grant by Committee.

## BALANCE SHEET.

LIABILITIES.	£ s. d.
To Publishers' Bill for June Quarter, 1910 ..	400 16 3
" Balance Credit .. .. .	1,847 6 5
	<hr/>
	£2,248 2 8

ASSETS.	£ s. d.
By Cash at Bank .. .. .	582 12 7
" Value of Stamps in Hand .. .. .	0 6 4
" Investments at Cost—	
India Stock .. .. .	£684 6 0
Purchased July 27, 1909 .. .. .	295 2 0
Consols Purchased April 90, 1910 .. .. .	568 7 3
	<hr/>
Furniture, &c., as per last Balance .. .. .	39 8 7
Sheet .. .. .	
Less 10 per cent. written off for depreciation .. .. .	3 18 10
	<hr/>
Outstanding Subscriptions .. .. .	35 9 9
for Reprints .. .. .	8 0 0
for Advertisements .. .. .	0 8 9
	<hr/>
	73 10 0
	<hr/>
	£2,248 2 8

FROM JULY 1, 1909, TO JUNE 30, 1910.

RECEIPTS.		EXPENDITURE.	
	£ s. d.		£ s. d.
To Publishers' Bills—		By Subscriptions to Journal	1,184 15 2
Journals	1,097 9 5	" " Outstanding June 30.	8 0 0
Corps News	191 14 10	" Deduct Subscriptions credited in error	1,192 15 2
Distribution List	25 9 0	" Deduct Subscriptions Outstanding June 30.	12 0 0
Seniority Roll	21 13 9	1909 .. ..	14 11 8
Reprints	20 1 10	" Subscriptions to Corps News	1,178 3 6
Stationery, Postages and Packing	85 7 8	" " Seniority Roll	30 19 2
Sundries	9 1 10	" Receipts for Reprints	16 10 1
Balance to Profit and Loss Account	359 8 11	" Amount Outstanding for Reprints June 30, 1910	£23 11 6
		" " "	0 8 9
		" Less Amount Outstanding for Reprints June 30, 1909	24 0 3
		" " "	6 7 11
		" Advertisements	17 12 4
		" Sales through Manager	296 6 3
		" " Publishers	5 14 4
		" " "	265 1 7
			£1,810 7 3

# PROFIT AND LOSS ACCOUNT.

RECEIPTS.		£	s.	d.	£	s.	d.
To Business Manager's Account—							
Stamps, Purchase of Back Numbers, &c.	..	30	16	0			
Clerk to Manager	..	24	0	0			
Clerk to Editor	..	12	12	0			
Postman	..	0	10	0			
Honorarium to Editor..	..	..	..	67	18	0	
" Clerk in Record Office	..	..	..	100	0	0	
Exchange on Drafts	..	..	..	6	10	0	
Cheque Book	..	..	..	0	2	0	
Depreciation of Furniture	..	..	..	0	1	2	
Fractions	..	..	..	3	18	10	
Balance carried to Balance Sheet—	..	..	..	0	0	1	
Net Profit during the year	..	£234	16	6			
Balance, July 1, 1909	..	1,612	9	11			
		1,847	6	5			
		<u>£2,025 19 6</u>					
EXPENDITURE.							
By Balance from last Account	..	..	..	1,612	9	11	
Gross Profit on Trading Account	..	..	..	359	8	11	
Interest on India Stock	..	..	..	30	9	7	
" War Loan Bonds	..	..	..	18	2	6	
" Deposit at Bank..	..	..	..	0	4	7	
Profit on Redemption of War Loan Bonds	..	..	..	5	4	0	

£2,025 19 6

July 11, 1910.

B. H. SCOTT, Major R.A.M.C.

Hon. Business Manager *Journal R.A.M.C.*

Examined and found correct.

EDMOND T. GANN.

## BIRTHS.

**MATTHEWS.**—On April 6, 1910, at Karachi, India, the wife of Captain J. Matthews, R.A.M.C., of a son.

**WALKER.**—On June 23, 1910, at Fermoy House, Fermoy, the wife of Captain F. S. Walker, R.A.M.C., of a daughter.

## MARRIAGES.

**MACPHERSON—DORAN.**—At St. Stephen's Church, Bath, by the Rev. Lambert Coghlan, Vicar of Marchwood, assisted by the Archdeacon of Bath, Colonel W. G. Macpherson, C.M.G., third son of the late Rev. W. Macpherson, of Kilmuir, Ross-shire, to Geraldine E., youngest daughter of the late General Sir John Doran, K.C.B., and of Lady Doran, Ely House, Wexford.

**TATE—GILBERT**—On June 7, at Christchurch, Sutton, Surrey, Captain R. G. H. Tate, R.A.M.C., to Edith Mabel, only daughter of A. Gilbert, Esq., of Sutton, Surrey.

**BRAKENRIDGE—BRASSEY.**—On June 29, at Bickerton Church, by the Rev. W. McKee, Captain F. J. Brakenridge, R.A.M.C., to Margery Helen, youngest daughter of the late Richard Brassey, Bulkeley Grange, Malpas, Cheshire.

## DEATHS.

**MACFADIN.**—At Ayr, on June 12, 1910, Honorary Brigade-Surgeon Francis Henry Macfadin, retired pay. Late Army Medical Department, aged 78. He entered the Army on December 1, 1854, served in the 11th, 13th, 47th, 73rd and 83rd Foot, on the staff, and in the Military Train and Army Medical Department. He became Surgeon on June 25, 1867; Surgeon-Major March 1, 1873, and retired on retired pay with the honorary rank of Brigade-Surgeon on January 7, 1882.

**PALATIANO.**—At Corfu, on June 26, 1910, Surgeon George Palatiano, M.D., retired, Medical Department, aged 81. He entered the Service on April 27, 1855, became Surgeon May 3, 1871, and retired on half-pay on August 31, 1872.

**PATTERSON.**—At 13, Burlington Road, Paddington, on July 1, 1910, Honorary Brigade-Surgeon Leslie Ogilby Patterson, half-pay, late Army Medical Department, aged 80. He entered the Service on June 7, 1854, served on the Staff, in the Royal Artillery, 22nd and 35th Foot, Royal Newfoundland Companies, Canadian Rifles, and Army Medical Department. He became Surgeon February 13, 1866; Surgeon-Major March 1, 1873, and retired on half-pay with the honorary rank of Brigade-Surgeon on August 25, 1880. His war service was: Burmese War, 1856; Indian Mutiny, 1858-9; Actions at Sirchooa (wounded), Julpoora, Brahminagunge, Rampore, Perowra, Jumaon, Karrisath, Jugdispore, Neenadee and Mahoolan. Despatches, *London Gazette*, January 31, 1859. Medal.

## EXCHANGES, &c.

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	16	0 12 0	0 5 3				
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	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

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The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in March and September of each year. 's, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

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THE HON. MANAGER,

"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"

WAR OFFICE, WHITEHALL, S.W.

## Notices.

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### EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

**All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.**

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Lieutenant-Colonel C. Birt, Major F. Smith, Lieutenant T. J. Mitchell, Major C. E. Pollock, A. Critien, Esq., M.D., D.P.H., Major G. A. Moore, Captain H. E. Gotelee, Captain W. Byam, Major J. C. B. Statham, Captain P. J. Marett, Lieutenant-Colonel T. Du B. Whate, Captain L. Bousfield, A. Balfour, M.D., B.Sc., Colonel H. G. Hathaway, Major E. C. Freeman, Lieutenant-Colonel H. P. Elkington, Major W. Tibbits.

The following publications have been received. —

*British.* The Indian Medical Journal, Journal of the United Service Institution of India, The Australasian Medical Gazette, The Journal of Tropical Veterinary Science, The Indian Medical Gazette, Guy's Hospital Gazette, Medical Press and Circular, Transactions of the Society of Tropical Medicine and Hygiene, Sleeping Sickness Bureau, The Royal Engineers' Journal, Journal of the Royal Sanitary Institute, The Hospital, The Lancet, Army and Navy Gazette, The Quarterly Journal of Medicine, The Practitioner, The British Journal of Tuberculosis, The Medical Review, St. Bartholomew's Hospital Journal, Public Health, Red Cross and Ambulance News, The Shield, The Cavalry Journal, The St. Thomas's Hospital Gazette, Journal of the Royal United Service Institution.

*Foreign:* Bulletin of the Manila Medical Society, Archiv für Schiffs- und Tropen-Hygiene, Le Caducée, Giornale di Medicina Militare, Annales d'Hygiène et de Médecine Coloniales, Revista de Sanidad Militar y La Medicina Militar Española, The Military Surgeon, Office International d'Hygiène Publique, Japanese Medical Journal, Russian Medical Journal.

# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

## Corps News.

SEPTEMBER, 1910.

### COMMANDS AND STAFF.

Colonel Menus O'Keeffe, M.D., to be Inspector of Medical Services, *vice* Colonel (temporary Surgeon-General) W. Babbie, V.C., C.M.G., M.B., appointed Deputy Director-General, Army Medical Service, dated July 28, 1910

### ESTABLISHMENTS.

ROYAL ARMY MEDICAL COLLEGE,

Major Edgar M. Pilcher, D.S.O., M.B., R.A.M.C., to be Professor of Surgery, *vice* Major C. G. Spencer, M.B., whose tenure of that appointment has expired, dated August 1, 1910.

### ARMY MEDICAL SERVICE.

#### MONTHLY ARMY LIST FOR AUGUST.

Owing to an editorial mistake in compiling the Monthly Army List for August, the names of Colonels Sir D. Bruce and T. P. Woodhouse were wrongly placed as regards their seniority. This will be corrected in the September Army List.

Colonel Edward North retires on retired pay, dated August 3, 1910; Colonel North entered the Army as Surgeon, Army Medical Department, March 6, 1880; became Surgeon-Major Medical Staff, March 6, 1892; Lieutenant-Colonel Royal Army Medical Corps, March 6, 1900; Lieutenant-Colonel with higher rate of pay, October 16, 1902; local rank of Colonel whilst serving in Mauritius, December 20, 1902; Colonel Royal Army Medical Corps, July 18, 1906.

His war service is: South African War 1899-1901: In charge of a General Hospital, Relief of Kimberley; operations in the Orange Free State February to May, 1900, including operations at Paardeberg (February 17 to 26); actions at Houtnek (Thoba Mountain); Vet River (May 5 and 6) and Zand River; operations in the Transvaal in May and June, 1900, including actions near Johannesburg, Pretoria, and Diamond Hill (June 11 and 12); operations in the Transvaal, west of Pretoria, 1900, including actions at Eland's River (August 4 to 16); operations in Orange River Colony, 1900, including actions at Bethlehem (July 7) and Wittebergen (July 15 to 29); operations in Cape Colony, south of Orange River 1899-1900, including actions at Colesberg (January 1 to February 2). Despatches *London Gazette*, April 16, 1901. Queen's medal with 7 clasps

Lieutenant-Colonel Richard H. S. Sawyer, M.B., from the Royal Army Medical Corps, to be Colonel, *vice* E. North, dated August 3, 1910.

Colonel Daniel O'Sullivan is placed on retired pay, dated August 14, 1910; Colonel O'Sullivan entered the Service as Surgeon, Army Medical Department, on July 31, 1880; became Surgeon-Major Army Medical Staff, July 31, 1892; Lieutenant-Colonel Royal Army Medical Corps, July 31, 1900; was selected for the higher rate of pay of that rank with effect from August 11, 1903; promoted Colonel on February 17, 1906.

**MEMORANDUM.**

Surgeon-General William W. Kenny, M.B., is appointed an Honorary Surgeon to the King, *vice* Surgeon-Major-General J. G. Faught, deceased, dated June 12, 1910.

**ROYAL ARMY MEDICAL CORPS.**

Lieutenant-Colonel Benjamin T. McCreery, M.B., half-pay list, retires on retired pay, dated July 23, 1910.

Lieutenant-Colonel McCreery entered the Service on March 6, 1880, as surgeon, Army Medical Department; became Surgeon-Major, Medical Staff, March 6, 1892; Lieutenant-Colonel Royal Army Medical Corps February 5, 1901; was placed on temporary half-pay on account of ill-health, March 22, 1910; and retired on retired pay July 23, 1910.

The undermentioned Lieutenants are confirmed in that rank: William H. O'Riordan; Charles T. V. Benson; William P. McArthur; Eustace M. Parsons-Smith; Lionel C. Hayes, M.B.; John Gilmour, M.B.; Campbell Robb, M.B.; Eric T. Gaunt, M.B.

The undermentioned Majors are placed on retired pay, dated July 29th, 1910: Henry J. Parry, D.S.O., M.B.; Robert W. H. Jackson, M.B.

Major Parry entered the Service on July 29, 1890, as Surgeon Medical Staff, became Major Royal Army Medical Corps, July 29, 1902.

His war service is South Africa, 1899-02; Relief of Ladysmith, including action at Colenso; operations of January 17 to 24, 1900, and action at Spion Kop; operations of February 5 to 7, 1900, and action at Vaal Kranz; operations on Tugela Heights (February 14 to 27, 1900) and action at Pieter's Hill; operations in the Transvaal and Orange River Colony; operations on the Zululand Frontier of Natal, September, 1901. Despatches, *London Gazette*, February 8, 1901. Queen's Medal with 5 clasps; King's Medal with 2 clasps; D.S.O.

Major Jackson entered the Service on July 29, 1890, as Surgeon Medical Staff, became Major Royal Army Medical Corps, July 29, 1902.

His war service is South Africa, 1901-2: Operations in the Transvaal and Orange River Colony (November, 1901, to May 31, 1902). Queen's Medal with 4 clasps.

Captain George H. Richard, from the half-pay list, is restored to the Establishment with precedence next below Captain C. W. O'Brien, dated July 25, 1910.

The undermentioned Captains to be Majors, dated July 27, 1910: George B. Crisp; Cecil W. Mainprize. Dated July 28, 1910. Alic L. Scott; Lionel E. L. Parker; Gerald H. Goddard.

The undermentioned Lieutenants to be Captains, dated July 28, 1910: Winfrid K. Beaman; Colin Cassidy; Alexander D. Fraser, M.B.; Archer Fortescue, M.B.; Howard G. Gibson; Stephen Field; Frederick H. M. Chapman; Henry M. J. Perry; John L. Wood; Frederick T. Turner; Michael P. Leahy, M.B.; William G. Avias; John E. M. Boyd; Donald F. Mackenzie, M.B.; Richard D. O'Connor; Owen R. McEwen; Malcolm O. Wilson, M.B.; John du P. Langrishe, M.B.; John C. Hart, M.B.; Thomas H. Scott, M.B.; Gerald F. Rudkin; Leopold A. A. Andrews; John H. Gurley; Alfred C. Elliott, M.B.; William B. Purdon, M.B.; Francis Casement, M.B.; Edward M. Middleton; Vincent T. Carruthers, M.B.; Harold W. Farebrother.

Captain Wilfred M. McLoughlin retires receiving a gratuity, dated August 13, 1910.

Captain McLoughlin entered the Service on November 17, 1899; was promoted Captain on November 17, 1902.

His war service is: South African War. 1899-1902; operations in the Orange Free State (March to May, 1900); operations in the Transvaal in May and June, 1900, including action near Johannesburg; operations in Cape Colony, including action at Colesberg; operations in Orange River Colony (January to May 1902); Queen's Medal with 3 clasps; King's Medal with 2 clasps.

The undermentioned Lieutenants to be Captains, dated March 7, 1910: Owen C. P. Cooke, Clarence H. Denyer.

**ARRIVALS HOME FOR DUTY.**—From India: Colonel M. W. O'Keeffe. From Straits Settlements: Major E. M. Pilcher, D.S.O. From West Africa: Captain D. J. F. O'Donoghue.

**ARRIVALS HOME ON LEAVE.**—Colonels H. W. Murray and T. J. O'Donnell, D.S.O. Lieutenant-Colonels L. W. Swabey, S. Powell, and H. B. Mathias, D.S.O. Majors A. E. C. Keble and A. H. Waring. Captains R. G. Anderson, G. A. D. Harvey, J. H. Graham, R. S. Smyth, H. E. Priestley, and J. A. B. Sim.

**POSTINGS.**—Major G. B. Carter and Captain G. H. Richard to Irish Command; Captain W. Beach and Captain L. Bousfield to London District; Captain A. R. C. Parsons to Scottish Command.

**TRANSFERS BETWEEN COMMANDS AT HOME.**—Colonel R. H. S. Sawyer from Royal Army Medical College to Irish Command; Major C. G. Spencer from Royal Army Medical College to Northern Command.

**APPOINTMENTS.**—Colonel M. W. O'Keeffe, Inspector of Medical Services. Colonel R. H. S. Sawyer, Administrative Medical Officer, Dublin District. Lieutenant-Colonel J. Maher, Charge of Queen Alexandra Military Hospital, London. Major C. G. Spencer, Specialist in Operative Surgery, Northern Command. Captain W. L. Steele, Specialist in Operative Surgery, Southern Command. Captain W. Riach, Specialist in Ophthalmology, London District. Captain A. R. C. Parsons, Specialist in Operative Surgery, Scottish Command. Captain R. B. Ainsworth, Sanitary Officer, Southern Command. Captain P. G. Easton, Medical charge of families, Aldershot.

**HIGHER RATE OF PAY.**—Lieutenant-Colonel W. C. Beevor, C.M.G., has been selected for the higher rate of pay under Article 317, Royal Warrant, from August 3, 1910, *vice* R. H. S. Sawyer promoted.

Approval has been given to the grant of pay at the higher rate, under the provision of Article 317 of the Royal Warrant, to the undermentioned Majors, *viz.*: H. E. Winter, A. E. Smithson, G. S. McLoughlin, D.S.O., W. W. O. Beveridge, D.S.O., R. J. W. Mawhinny, G. A. T. Bray, B. Forde, and J. D. Ferguson, D.S.O.

**QUALIFICATIONS.**—The undermentioned officers have obtained the degrees, &c., specified, *viz.*: Major D. J. Collins, M.D., University of Belfast; Major F. S. St.D. Green, M.B. University of Durham; Captain A. H. Hayes, Diploma of Public Health, Royal Colleges of Physicians and Surgeons, England.

**ROSTER FOR SERVICE ABROAD.**—An exchange has been approved between Major G. A. Moore and Major C. H. Hale, D.S.O.

The undermentioned officers having notified their intention to retire, their names have been removed from the roster, *viz.*: Lieutenant-Colonels T. H. F. Clarkson and H. W. Austin.

Major G. T. Rawnslay's name has been added to the list of officers required to proceed abroad during the ensuing season.

Captains N. E. J. Harding, C. R. Millar, and F. Ritchie have been warned for service in West Africa in October.

The dates of embarkation of the undermentioned officers have been altered to those now given: Captains J. F. Whelan, F. W. W. Dawson, and A. C. Duffy, March 3; Captain E. G. French, October 5; Captain F. W. Lambelle, January 5; Lieutenants D. E. C. Pottinger, D. J. Buist, A. M. Pollard, C. H. O'Rourke, C. G. Sherlock, S. W. Kyle, J. W. Lane, W. G. Wright, and A. T. J. McCreery, February 8.

The undermentioned retired pay appointments are vacant. Medical Charge at Berehaven, Netheravon, Perth, Fort Stamford, and Coventry.

### RESULTS OF EXAMINATIONS.

The following results of examinations are notified for general information:—

Passed for the rank of Lieutenant-Colonel in all technical subjects: Majors J. H. Campbell, D.S.O. (92 per cent. in A.M.O.); J. E. Brogden; C. E. P. Fowler, F.R.C.S.; H. V. Prynne (81 per cent. in A.M.O.).

Passed in A.M.O.: A. C. Fox; G. St.C. Thom, M.B.; E. B. Steel, M.B.

Passed in Med. Hist., &c.: A. C. Fox; G. St.C. Thom, M.B.; E. B. Steel, M.B.

Passed in (d) i. for promotion to Lieutenant-Colonel: P. Mackessack, M.B. (77 per cent.); C. E. P. Fowler, F.R.C.S.; L. F. Smith, M.B.. To Major: J. B. Clarke, M.B.; J. M. B. Rahilly, M.B.

Passed for promotion to the rank of Captain in (b): H. S. Ranken, M.B.

Passed in (h): V. T. Carruthers, M.B.; H. S. Dickson; R. E. Todd, M.B.; T. McC. Phillips, M.B. (80 per cent.), Special Certificate; H. W. Farebrother; F. L. Dowling, M.B.; C. P. O'Brien-Butler; H. H. Blake, M.B.

Passed in (h) ii.: A. D. Fraser, M.B.; A. M. Benett; H. W. Carson, M.B.; J. R. Lloyd.

Passed in (h) iii.: A. D. Fraser, M.B.; A. M. Benett; R. F. O'T. Dickinson; H. W. Carson, M.B.; J. R. Lloyd.

Passed in (d) ii.: A. D. Fraser, M.B.; V. T. Carruthers, M.B.; H. S. Dickson; R. E. Todd, M.B.; C. McQueen (75 per cent.); A. M. Benett; O. C. P. Cooke (75 per cent.); C. H. Denyer; R. F. O'T. Dickinson (75 per cent.); T. M. C. Phillips, M.B. (75 per cent.); H. W. Carson, M.B.; F. L. Dowling, M.B. (75 per cent.); J. R. Lloyd; H. H. Blake, M.B.

**RESULT OF THE SENIOR COURSE OF INSTRUCTION AT THE ROYAL ARMY  
MEDICAL COLLEGE, TERMINATING JULY 30, 1910.**

Name	Class of Certificate awarded	Acceleration of promotion, period eligible for.	Qualified as specialist in
Steele, W. L. .. .. .	2nd	6 months	Operative surgery
Rugg, G. F. .. .. .	"	6 "	" "
Rutherford, R. . . . .	"	6 "	" "
Ranking, R. M. . . . .	"	6 "	Operative surgery
Wallace, G. S. . . . .	"	6 "	" "
Easton, P. G. . . . .	"	6 "	Midwifery, &c.
Ainsworth, R. B. . . . .	"	6 "	Bacteriology
Tyndale, W. F., C.M.G. . . . .	"	6 "	State medicine
Balck, C. A. J. A. . . . .	"	6 "	Physic, training
Worthington, E. S. . . . .	"	6 "	Operat surgery
Coates, T. S. . . . .	3rd	3 "	" "
Russell, H. W. . . . .	"	3 "	Bacteriology
Reed, G. A. K. H. . . . .	"	3 "	Physic, training
Ahern, D. . . . .	"	3 "	" "
Ryley, C. . . . .	"	3 "	" "
Hayes, A. H. . . . .	"	3 "	Bacteriology
Kelly, W. D. C. . . . .	"	3 "	Operative surgery
Frost, A. T. . . . .	"	3 "	Dermatology, &c.
Murphy, J. P. J. . . . .	"	3 "	" "
McKenzie, J. . . . .	"	3 "	" "
Gatt, J. F. H. . . . .	"	3 "	" "
Douglas, H. E. M., V.C., D.S.O. . . . .	"	3 "	" "
Rowan-Robinson, F. E. . . . .	"	3 "	" "
Clarke, F. A. H. . . . .	"	3 "	State medicine
Conway, J. M. H. . . . .	"	3 "	" "
Walker, N. D. . . . .	"	3 "	Physical training
Storrs, R. . . . .	"	3 "	Midwifery, &c.
Crossley, H. J. . . . .	"	3 "	" "
Power, F. . . . .	"	3 "	Dermatology
Millar, C. R. . . . .	"	3 "	" "
Ritchie, T. F. . . . .	"	3 "	" "
Harding, N. E. J. . . . .	"	3 "	" "
Browne, W. M. . . . .	"	3 "	Physical training
Myles, C. D. . . . .	"	3 "	" "
Dawson, F. W. W. . . . .	"	3 "	" "
Whelan, J. F. . . . .	"	3 "	" "
Beatty, M. C. . . . .	"	3 "	" "
Duguid, J. H. . . . .	"	3 "	" "
Harding, D. L. . . . .	Passed	—	Otology, &c.
Cotterill, L. . . . .	"	—	State medicine
McMunn, A. . . . .	"	—	" "
Bagshawe, H. V. . . . .	"	—	State medicine
Sampey, A. W. . . . .	"	—	" "
Adderley, A. C. . . . .	"	—	" "
Croly, W. C. . . . .	"	—	" "
Franklin, R. J. . . . .	"	—	" "
Harvey, W. J. S. . . . .	"	—	" "
Winder, J. H. R. . . . .	"	—	" "
Thorpe, L. L. G. . . . .	"	—	" "

**NOTES FROM ALDERSHOT.**—Privates Day and Lowe write: "The Royal Army Medical Corps Branch of the Royal Army Temperance Association held their Annual Outing on Wednesday, July 20, 1910. The place chosen was Southsea.

"About 200 members left Aldershot by special train at 8 a.m., and the weather

promising to be very fine a very enjoyable day was looked forward to, but before Portsmouth Town Station was reached a steady drizzle set in, which somewhat damped the enthusiasm of not a few; however, shortly after our arrival the weather cleared and sunshine prevailed for the remainder of the day.

"A programme of the various places of interest had been obtained by our energetic Secretary (Serjeant J. W. Robinson), which proved of great convenience to those who had not visited Southsea before. The chief attraction appeared to be the Clarence Pier, which was extremely well patronized. 'The Gems,' who were appearing there for the week, rendered a fine display of musical talent which was both amusing and edifying.

At the conclusion of this performance the party proceeded to the 'Duchess of Albany' Soldiers' Home, where a substantial luncheon was well catered for by Mr. Grant (the manager). The menu was as follows:—

*Luncheon.*

Roast Beef,	Roast Mutton.
Veal and Ham Pie.	
Green Peas.	Cabbage.
Potatoes.	
<i>Sweets.</i>	
Apple Tart	Cherry Tart.
	Gooseberry Tart.
Rice Pudding.	Tapioca Pudding.
Cheese.	Biscuits.
Tea and Coffee.	

"After lunch the members distributed themselves into numerous parties, both young and old finding many varieties of amusement on the extensive promenade and beach, many participating in drives, bathing, &c.

"The afternoon passing away much too quickly in this manner a return was made to the Soldiers' Home where the party did justice to an excellent tea. After tea the majority of the members attended the Hippodrome Music Hall, where several well-known artists were appearing, others passed the time away with walks along the promenade, &c.

"The hour of return arriving all too soon, a departure was made at 9.5 p.m., and the party arrived at Aldershot at 11 p.m., after experiencing a most enjoyable day.

"In conclusion, the thanks of all are due to our esteemed Secretary for the able manner in which everything was arranged, and also to the London and South Western Railway Company for the comfortable and commodious travelling accommodation."

**NOTES FROM SIMLA.**—Lieutenant-Colonel R. S. F. Henderson, V.H.S., R.A.M.C., Secretary to Principal Medical Officer, His Majesty's Forces in India, writes under date July 21, 1910:—

"*Appointments.*—Colonel T. J. O'Donnell is appointed Principal Medical Officer, Karachi Brigade.

"Following officers have been appointed to the command of station hospitals noted:—

"Lieutenant-Colonel M. O'D. Braddell, Rawalpindi.

"Major E. M. Haassard, Lahore Cantonment.

"Captain P. C. T. Davy, Jutogh.

"*Exchange.*—Approval has been given to the exchange between Captain R. K. White, I.M.S., and Captain A. A. McNeight, R.A.M.C.

"*Specialists.*—The following officer is appointed Specialist in Dermatology, with effect from the date noted against him:—

"Lieutenant F. J. Stuart, 7th (Meerut) Division, from July 5, 1910."

**NOTES FROM CAWNPORE.**—Lieutenant A. Irvine Fortescue has joined for duty here, and has been attached to the Gordon Highlanders. Captain J. B. Cautley has retired.

Lieutenant-Colonel W. A. Morris, Captain A. A. McNeight, and Lieutenant A. Irvine Fortescue entertained H. E. The Commander-in-Chief at a garden party, and 400 guests were invited to meet him. The lawn at the Club was taken up, and looked very pretty with a large shamiana and many different tents scattered about. The Pipers and Band of the Gordons played throughout the afternoon, and were much appreciated. Not the least interesting feature was the presence of many Native officers, for whom special arrangements had been made. They were all presented to His Excellency. The entertainment was a great success and was much appreciated.

Captain McNeight is leaving us, having exchanged with Captain White I.M.S., at

Ferozepore, to which place he proceeds immediately. We shall miss him in our hockey team, and in sport generally, in which he has taken great interest.

"Lieutenant-Colonel W. A. Morris is in Simla, having been selected as the Royal Army Medical Corps member of a Board to consider the question of the introduction of the Station Hospital system for Indian Troops.

**NOTES FROM MHOW :—**ST. JOHN AMBULANCE ASSOCIATION. MHOW CENTRE.—A meeting, which was largely attended by representatives of all the community, was held at Mhow on the 2nd inst., for the organisation of a centre for the Central Provinces Area of the Association.

Lieutenant-General Des Vœux, commanding the Division, who presided, explained the objects of the Association, and laid stress on the keen personal interest taken in the movement by His Majesty the King and His Excellency the Viceroy.

The details of organization and finance, furnished by Mr. V. Gabriel, C.V.O., the First Assistant to the Agent to the Governor-General and Secretary of the Central Provinces Area of the Association, were then read and the following Committee formed :—

*President.*—The General Officer Commanding, Mhow Division : Lieutenant-General C. H. Des Vœux C.B.

*Members.*—The Principal Medical Officer, Mhow Division : Lieutenant-Colonel J. W. Rodgers, I.M.S. The Cantonment Magistrate : Major V. De V. Hunt. One officer from each regiment in Mhow. The Chaplain, Church of England : Rev. F. W. Martin, M.A. The Chaplain, Church of Scotland : Rev. E. J. Drew. The Roman Catholic Chaplain : The Rev. Fr. Ferdinand. The Wesleyan Chaplain : The Rev. A. E. Knott. Major E. W. Bliss, R.A.M.C. ; Mr. A. Newton, Ex-Engineer R. M. Railway ; Mr. C. G. Walsh, Superintendent of Police ; Mr. H. A. Minto, S. and T. Corps ; Mr. Dhunjishaw C. Pestonjee.

*Secretary and Treasurer.*—Lieutenant-Colonel S. Westcott, C.M.G., V I I S., R.A.M.C.

### LIST OF CASUALTIES.

**DISCHARGES.**—6891 Serjeant-Major A. Fowler, August 4, 1910, to pension ; 6874 Quartermaster-Serjeant J. G. McLean, July 21, 1910, after three months' notice ; 8503 Quartermaster-Serjeant J. L. Driver, August 9, 1910, termination of second period ; 7746 Staff-Serjeant G. O. Cowthard, July 17, 1910, after three months' notice ; 8474 Staff Serjeant F. Oliver, July 21, 1910, termination of second period ; 11867 Serjeant W. Wright, July 14, 1910, termination of first period ; 8501 Corporal J. A. C. Taylor, August 6, 1910, termination of second period ; 8509 Lance-Corporal S. F. Young, August 13, 1910, termination of second period ; 8469 Private A. Potter, July 17, 1910, termination of second period ; 17808 Private J. Hickey, July 28, 1910, medically unfit ; 11891 Private J. Legge, July 31, 1910, termination of first period ; 11922 Private A. Bartley, August 7, 1910, termination of first period ; 11898 Private J. Wilcox, August 8, 1910, termination of first period.

**TRANSFERS TO ARMY RESERVE.**—17751 Corporal T. F. Swann, July 10, 1910 ; 17753 Private J. J. Owen July 15, 1910 ; 17757 Private A. C. Woods, July 14, 1910 ; 1119 Private T. G. Kay, July 10, 1910 ; 1121 Private D. Hogan, July 14, 1910 ; 17763 Private W. J. Shearn, July 15, 1910 ; 1136 Private J. Spence, July 22, 1910 ; 17769 Private J. Evans, July 16, 1910 ; 17785 Corporal J. L. Shore, July 20, 1910 ; 17771 Private W. Francis, July 20, 1910 ; 17790 Private G. H. Barber, July 23, 1910 ; 17774 Private W. H. Burt, July 22, 1910 ; 17792 Private C. Chittenden, July 22, 1910 ; 17972 Private G. Burgess, July 22, 1910 ; 1150 Private T. Hall, July 31, 1910 ; 19237 Private W. Naylor, July 27, 1910 ; 17810 Private F. J. Suittors, July 28, 1910 ; 1146 Private D. Kennedy, July 29, 1910 ; 17815 Private W. E. J. Fruin, July 29, 1910 ; 17819 Private T. A. Spence, July 31, 1910 ; 1178 Private J. Thompson, August 2, 1910 ; 1155 Private J. Gledhill, August 4, 1910 ; 17824 Private P. Gardiner, August 3, 1910 ; 17845 Corporal A. G. Worsfold, August 10, 1910 ; 17840 Private H. Walker, August 12, 1910 ; 17836 Corporal T. S. Pratt, August 10, 1910.

**TRANSFERS TO OTHER CORPS.**—18801 Serjeant G. H. Wolfe, July 13, 1910, to Northern Nigeria ; 17278 Serjeant J. McLennan, July 13, 1910, to Northern Nigeria ; 8903 Staff-Serjeant J. Robson, July 20, 1910, to Territorial Forces.

**TRANSFERS FROM OTHER CORPS.**—15948 Serjeant G. D. Christie, July 8, 1910, from Northern Nigeria ; 11214 Staff-Serjeant W. E. Squire, July 17, 1910, from Egyptian Army ; 9703 Staff-Serjeant W. B. Heponstall, August 3, 1910, from Territorial Forces.

## EMBARKATIONS FROM ABROAD.

To Sierra Leone, per ss. "Accra," June 30, 1910: 10892 Staff-Serjeant H. J. Reeve, 16205 Serjeant T. Gregson, 17513 Corporal J. Gallivan, 16325 Corporal A. F. Gibbs, 19029 Corporal R. E. Harvey, 148 Lance-Corporal T. H. Allbeury.

## DISEMBARKATIONS FROM ABROAD.

From Northern Nigeria, July 8, 1910: 15948 Serjeant G. D. Ohristie.

From Malta, per ss. "Creole Prince": 18902 Corporal W. Blundell, 18215 Lance-Corporal W. W. Dewey.

From Egyptian Army, July 17, 1910: 11214 Staff-Serjeant W. E. Squire.

From Sierra Leone, per ss. "Mendis," July 23, 1910: 18969 Corporal E. Gray, 19863 Private W. H. Mattison.

From Sierra Leone, per ss. "Dakar," July 31, 1910: 16053 Serjeant S. M. Gawthorn, 751 Corporal A. J. Milne.

## DEATHS.

511 Private F. Beauchamp, July 13, 1910, at Tientsin, North China.

THE FOLLOWING N.C.O.'s AND MEN HAVE QUALIFIED FOR PROMOTION  
IN THE VARIOUS CORPS EXAMINATIONS:—

*For Quartermaster-Serjeant.*—11051 Staff-Serjeant H. Williams, 11507 Staff-Serjeant D. C. Baxter, 14008 Staff-Serjeant D. Watt.

*For Staff-Serjeant.*—12583 Serjeant H. Ebbs, 16216 Serjeant J. W. Robinson, 12025 Serjeant A. E. Harrold, 18453 Serjeant F. A. Philbrook.

*For Serjeant.*—8770 Corporal H. Wilson, 14706 Corporal J. Cairns, 16678 Corporal J. E. March, 18977 Corporal C. M. Pickup, 17060 Corporal S. Reeves, 9121 Lance-Serjeant S. Barter, 17632 Corporal H. C. A. Lunn, 12965 Lance-Serjeant H. E. Fyler, 12779 Corporal G. Stubbs, 12486 Corporal J. McKay.

*For Corporal.*—16768 Private H. E. Barton, 4641 Private G. F. Gladman, 4882 Private F. G. Summers, 18061 Private W. Cairns, 19464 Private C. Chamberlain, 1827 Private T. F. Spratt, 4357 Private T. H. Harding.

*Passed as Dispensers.*—12002 Corporal W. J. Kneec, 18463 Corporal F. W. Day, 17380 Private J. H. D. Haigh, 19121 Private T. Cook, 18906 Private T. G. Whyatt, 17573 Corporal C. Harlen.

## PROMOTIONS.

The following promotions, to complete Establishment, will take effect from the dates specified:—

*To be Serjeant-Major.*

No.	Rank and Name	Date	Section	Remarks
10244	Qmr.-Serjt. A. P. Barnard	5.8.10	..	Vice A. Fowler.

*To be Quartermaster-Serjeant.*

9691	S.-Serjt. G. Arnold	..	2.5.10	..	Vice H. H. Collins, to pension.
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*To be Staff-Serjeants.*

14461	Serjt. A. Baker	..	10.4.10	..	Vice N. Cornell, to pension.
12932	.. C. Gordon	..	2.5.10	..	.. G. Arnold, promoted.
9747	.. C. Williams	..	21.5.10	..	Under para. 351 King's Regulations. Supernumerary with Territorial Forces.
9953	.. E. J. Lovegrove	..	26.5.10	..	Vice G. P. Jones, to pension.

*To be Staff-Serjeants—continued.*

No.	Rank and Name	Date	Section	Remarks
10087	„ E. Canterbury ..	1.6.10	..	Under para. 351 King's Regulations. Supernumerary with Territorial Forces.
13856	„ R. J. McKay ..	22.6.10	..	Vice G. A. Howell, to Officer's Training Corps.
16115	„ E. B. Dewberry ..	22.6.10	..	„ R. J. McKay, Supernumerary with Colonial Government.
17183	„ J. S. Robinson ..	22.6.10	..	„ W. Allford, Officers' Training Corps.
10327	„ J. C. Carder ..	22.6.10	..	„ J. S. Robertson, supernumerary with Colonial Government.
14290	„ W. H. Scott-Badcock	22.6.10	..	„ J. C. Carden, Supernumerary with Territorial Forces.
9305	„ H. Maffey ..	27.6.10	..	„ H. Wilkins, to Officers' Training Corps.
8903	„ J. Robson ..	27.6.10	..	„ H. Maffey, Supernumerary with Territorial Forces.
10511	„ F. Morgan ..	30.6.10	..	Under para. 351 King's Regulations. Supernumerary with Territorial Forces.
10751	„ G. C. Neeves ..	27.7.10	..	Special under para. 351 K.R.
11029	„ A. Spowage ..	3.8.10	..	„ „ „

*To be Serjeants.*

12506	Lce.-Serjt. J. P. O'Rourke	4.4.10	Nursing ..	Vice P. E. Wagstaffe to Territorial Forces.
18391	Crpl. E. C. Turner ..	4.4.10	General Duty	„ J. R. Jebson, to Territorial Forces.
11327	„ M. K. Quinlan ..	10.4.10	Nursing ..	„ A. Baker, promoted.
12053	„ W. Ross .. ..	13.4.10	Q.A.I.M.N.S.	„ F. S. Flint to Colonial Government.
16564	Lce.-Serjt. C. Vickers ..	2.5.10	Nursing ..	„ C. Gordon, promoted.
15671	„ R. W. Cole ..	11.5.10	Clerical ..	„ A. E. Barrett, to Territorial Forces.
12676	„ A. E. Young	26.5.10	„ ..	„ E. J. Lovegrove, promoted.
15483	„ E. Sharp ..	18.6.10	General Duty	„ A. P. Spackman, to Egyptian Army.
17057	„ M. Ward ..	22.6.10	Q.A.I.M.N.S.	„ E. B. Dewberry, promoted.
11734	Crpl. A. H. O. Campion	22.6.10	Nursing ..	„ W. H. Scott-Badcock, promoted.
11405	Lce.-Serjt. W. Scott ..	27.6.10	„ ..	„ J. Robson, promoted.
15610	Crpl. T. H. Griggs ..	28.6.10	„ ..	„ E. B. Snowden to pension.
9975	„ J. E. Partridge ..	1.7.10	General Duty	„ H. Hart, to pension.

*To be Corporals.*

To complete establishment, 1,7.10: 17726 Lance-Corporal C. P. Murphy, General Duty; 17727 Lance-Corporal A. Wrigley, Clerical; 17735 Lance-Corporal W. Wilson, Clerical; 17751 Lance-Corporal T. F. Swann, General Duty; 17752 Lance-Corporal E. Ricketts, Nursing; 18332 Lance-Corporal B. B. Bevan, Cooking; 17787 Lance-Corporal A. H. Whyatt, General Duty; 17794 Lance-Corporal W. A. Beckett, Q.A.I.M.N.S.; 17825 Lance-Corporal N. Moore, Nursing; 17836 Lance-Corporal T. S. Pratt, Nursing; 17845 Lance-Corporal A. Worsfold, Nursing; 17865 Lance-Corporal A. Abbott, Nursing; 17848 Lance-Corporal T. Reilly, Nursing; 18816 Lance-Corporal G. W. Bond, General Duty; 17875 Lance-Corporal R. Walton, General Duty; 17870 Lance-Corporal E. Cragg, General Duty; 17925 Lance-Corporal R. Sheerin, Nursing; 17964 Lance-Corporal W. Bowler, Nursing; 17977 Lance-Corporal D. Davis, Cooking; 18865 Lance-Corporal J. Ward, General Duty; 18657 Lance-Corporal V. Tripp, Clerical; 19192 Lance-Corporal F. Pool, Nursing.

**APPOINTMENTS.**

The following appointments, to complete Establishment, will take effect from the dates specified:—

*To be Lance-Serjeants (as Dispensers).*

To complete Establishment, 1,7 10.—10386 Corporal F. J. Howell, General Duty; 10955 Corporal J. H. Howe, General Duty; 12038 Corporal I. H. Garlick, General Duty; 15648 Corporal E. J. Hill, Nursing; 14356 Corporal W. L. Vyse, General Duty; 17521 Corporal H. G. Parsons, Nursing; 18717 Corporal C. H. Hart, General Duty.

*To be Lance-Corporals.*

No.	Rank and Name	Date	Section	Remarks
19652*	Pte. C. V. Jefford ..	1.6.10	Nursing ..	To complete Establishment.
764*	" R. Boddy ..	1.6.10	" ..	
148*	" T. H. Albeury ..	9.6.10	" ..	
391*	" W. J. Scorey ..	20.6.10	General Duty	
2046*	" F. J. Hammond ..	20.6.10	Clerical ..	
11951	" T. J. Hoodless ..		Nursing ..	
1847	" R. W. Ogg..		" ..	
13036	" S. Flood ..		" ..	
14956	" E. J. Stangroom ..		" ..	
15174	" A. J. Forbes ..		" ..	
16299	" E. P. Plunkett ..		1st Class Clerk	
16979	" R. V. V. Egan ..		Nursing ..	
17894	" G. R. Syrett ..		General Duty	
18181	" W. A. Baker ..		" ..	
18243	" W. Vincent ..		Cooking ..	
18506	" R. W. Cray ..	1.7.10	General Duty	
18507	" W. A. Gerrie ..		1st Class Clerk	
18509	" J. McFarland ..		Nursing ..	
18518	" J. W. Darlington..		" ..	
18524	" T. H. Smitherman		1st Class Clerk	
18530	" A. Murphy..		" ..	
18545	" J. Douglas..		Q.A.I.M.N.S.	
18571	" F. T. Pepper ..		Clerical ..	
18833	" R. Crook ..		Cooking ..	
18559	" G. F. Rodgers ..		General Duty	
18631	" A. J. Walton ..		Nursing ..	
18906	" T. G. Whyatt ..	13.7.10	" ..	Special under para. 231 S.O.
19563	" H. Harrington ..	25.7.10	" ..	

\* Special under para. 231. Standing Orders, R.A.M.C.

**Nursing Section.**—The following appointments to the Nursing Section of the Corps will take effect from the dates specified:—

No.	Rank and Name	Date	No.	Rank and Name	Date
15027	Sjt. W. Bush .. ..	7.3.10	2218	Pte. G. Snape .. ..	27.5.10
4368	Pte. C. Hardy .. ..	12.4.10	4345	„ E. J. Bate .. ..	27.5.10
4439	„ W. J. Mathews ..	14.4.10	4429	„ R. Beck .. ..	27.5.10
4455	„ T. J. Nice .. ..	14.4.10	4474	„ T. Rimmer .. ..	27.5.10
18385	Sjt. F. W. Coupland ..	16.4.10	4601	„ L. H. Ginnman ..	27.5.10
1746	Pte. E. J. McLachlan ..	16.4.10	4343	„ W. S. Parr .. ..	27.5.10
2086	„ H. Grimes .. ..	16.4.10	2242	„ J. Thomson .. ..	30.5.10
2120	„ A. Q. Smith .. ..	19.4.10	4308	„ R. H. Richards ..	30.5.10
2219	„ W. Porter .. ..	19.4.10	1068	„ A. W. Rutherford ..	6.6.10
4558	„ H. I. Birch .. ..	26.4.10	2034	„ H. F. Beck .. ..	8.6.10
4562	„ F. C. Wood .. ..	26.4.10	1270	„ F. G. Marrable ..	13.6.10
4650	„ G. P. Kelsey .. ..	26.4.10	12264	Sjt. W. G. Delamere ..	15.6.10
4330	„ H. R. Morman .. ..	28.4.10	18850	„ G. W. Eagles .. ..	17.6.10
4356	„ R. Woodman .. ..	28.4.10	459	Pte. D. Adams .. ..	17.6.10
4377	„ S. J. Lovegrove ..	29.4.10	13664	Sjt. J. C. Dunn .. ..	17.6.10
10	„ G. F. Cushing .. ..	2.5.10	4487	Pte. R. B. Priest .. ..	17.6.10
4638	„ R. F. Rochrig .. ..	14.5.10	4781	„ M. J. Gilbert .. ..	17.6.10
15911	„ C. Phillips .. ..	17.5.10	18854	„ C. D. Forge .. ..	20.6.10
2137	„ F. Crack .. ..	17.5.10	4607	„ J. Anderson .. ..	25.6.10
4545	„ G. Morison .. ..	17.5.10	4730	„ J. Freeman .. ..	25.6.10
4643	„ P. Lillywhite .. ..	17.5.10	4754	„ H. Sanders .. ..	25.6.10
2290	„ G. K. Anderson .. ..	24.5.10	13194	Lance-Sjt. W. F. Avery	27.6.10
2300	„ A. G. Barker .. ..	24.5.10	2166	Pte. W. F. Mathias ..	27.6.10
1822	„ J. E. Hanchiff .. ..	25.5.10			

**Advancement of Privates (Corps Pay).**—The following advancements in rate of Corps Pay will take effect from July 1, 1910:—

*To be Advanced to the Third Rate (at 8d.).*

*As Orderlies.*

No.	Name	No.	Name	No.	Name
16809	Riding, A. E. H.	19510	Caulfield, H. S. ..	1336	Dovey, C.
18266	Knibbs, F. ..	19634	Kelliher, J. E. ..	1355	Wilson, J.
18387	Daniels, W. ..	19734	Peters, H. F. ..	1539	Catlin, F. G.
18950	Fielder, A. J. ..	19802	Leakey, A. ..	1554	Goldsbrough, R. E.
19030	Mann, R. S. ..	19971	Biggins, E. J. ..	1656	Chivers, A. H.
19099	Drinkwater, C. G.	87	Woodley, A. W. ..	1690	Hargreaves, G.
19215	Leonard, P. ..	179	Roe, A. E. ..	1782	Topp, S. J.
19246	Laing, J. .. ..	904	Dunn, J. J. ..	2201	Ring, R. ..
19432	Parker, W. T. ..	1039	Hall, A. F. ..		
19481	Mills, A. W. V. ..	1051	Davey, W. H. ..		

*As Clerks.*

1718	Low, L. W. ..	1759	Mcenagh, J. H. ..	1970	Brunt, W. J. G.
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*To be Advanced to the Fourth Rate (at 6d.).*

*As Orderlies.*

No.	Name	No.	Name	No.	Name
14445	Smith, W. E.	1472	Ribbons, E. D.	2009	Latimer, H.
15009	Williams, W.	1504	Kirby, A. F. P.	2023	Riordan, D.
18656	Maywood, H. G.	1582	Feasey, J. W.	2034	Beck, H. F.
18779	Savage, N.	1700	Waterfield, E.	2060	Hoult, E.
19135	Quelch, W. H.	1742	Darwen, I.	2071	Cootte, R. H.
19170	Jessop, A. G.	1754	Card, W. F.	2083	Pearce, W. G.
19409	Hutchinson, A.	1771	Leal, L. F.	2095	Rudd, P. J.
19461	Brown, E. E.	1801	Cameron, A.	2114	Stokes, H. S.
19607	Pottow, R. C.	1860	Wood, A. J.	2135	Kellow, W.
19776	Swan, G.	1884	Gaughan, E. S.	2169	Hayward, B. W.
19824	Worrell, C. H.	1889	Wilkes, J. T.	2170	Tromans, W. B.
19835	Sandys, A. E.	1891	Rance, H. J.	2186	Jenkins, H. E.
43	Harding, A. W.	1894	Benjafield, H. J.	2208	Lake, S. H.
296	Wilson, F. G.	1914	Dugmore, E.	2213	Ward, J. J. S.
590	Gilbert, F. C.	1919	Vyse, F. H.	2220	Anstey, R. J.
728	Brooks, A. T.	1929	Robbins, E.	2222	Baker, W. H.
1018	Levor, H.	1946	Jane, E.	2226	Chatting, F. J.
1131	Burze, F. V.	1953	Marchant, H.	2234	Macdonald, A.
1216	Dunne, J.	1964	Shipton, H. G.	2242	Thomson, J.
1258	Clunton, J.	1969	Overton, G. W.	2249	Burbage, E.
1360	Doyle, J.	1987	Herbert, J. C.	2258	Edmonds, W.
1400	Barnber, E.	1988	Rhodes, H.	2264	Blake, W. T. H.
1407	Staples, G.	1993	Passingham, E. G.	2268	Danks, T.
1414	Ball, T.	2002	Craddock, G.	4308	Richards, R. H.
1465	Smart, W. W.	2006	Bray, J. E.		
<i>As Clerks.</i>					
19149	Whitbread, A. C.	1487	Barry, A. E.	2259	Wilson, S. W.
19271	Dale, A. W.	1753	Aitken, A.		
1375	Shipton, H.	1757	Marshall, W. J.		
<i>As Cooks.</i>					
19675	Newland, J. C.	2139	Slade, C. F.	4309	Walter, A. J.
198	Godsell, A. V.				

**Sanitary Orderlies (Corps Pay).**--The following Privates are advanced to the Fourth Rate of Corps Pay at 6d., as Sanitary Orderlies, from the dates specified:--

No.	Name	Date	No.	Name	Date
19761	Whitworth, L.	.. 21.1.10	18978	Smith, W. J. A.	.. 17.5.10
239	Witcombe, R. G.	.. 18.4.10	2140	Armstrong, J.	.. 20.5.10
1899	Slawson, W. H.	.. 26.4.10 *	19482	Dean, F.	.. 21.5.10
1868	Browne, E. B.	.. 27.4.10	1984	Whelan, W.	.. 30.5.10
17820	Peckham, H.	.. 1.5.10	18529	Christie, J.	.. 5.6.10
1591	Ince, J.	.. 4.5.10	1252	Wickers, P.	.. 7.6.10
19297	Rote, F. H. A.	.. 8.5.10	2052	Berrett, S. J.	.. 9.6.09

**Buglers.**—The following Boys are appointed Buglers from the dates specified :—

No.	Name	Date	No.	Name	Date
2275	Ross, W. C. .. ..	1.6.10	4682	Taylor, A. E. ..	13.6.10
2058	Page, F. C. .. ..	13.6.10	4945	Forman, J. E. ..	13.6.10

**Promotion Amendments.**—(1) With reference to Corps Order dated October 1, 1909, under the heading "To be Staff-Serjeants" after the name of No. 10892 H. J. Reeve, insert: 9708 Serjeant W. B. Heponstall, August 13, 1909, *vice* G. Cookson, promoted, and amend the remarks against the name of No. 11509 J. J. Earp, to read, *vice* W. B. Heponstall, Supernumerary with Territorial Forces.

(2) With reference to Corps Order dated January 1, 1910, the promotion of No. 9984 Quartermaster-Serjeant F. C. Cross to be Serjeant-Major has been antedated to October 29, 1909 (without back pay), with seniority next below No. 8704 Serjeant-Major T. J. Tilbrook.

**Queen Alexandra's Imperial Military Nursing Service.**—It is notified for general information that authority has been received from the War Office for No. 17757 Private A. C. Woods to retain the Badge of the Queen Alexandra's Imperial Military Nursing Service, on being transferred to the Army Reserve, as a reward for specially meritorious service.

### SPECIAL RESERVE OF OFFICERS.

#### ROYAL ARMY MEDICAL CORPS.

Alexander Cosgrave Court, M.B., to be Lieutenant (on probation), dated June 17, 1910.

Lieutenant Morton W. Ruthven, M.B., is confirmed in his rank.

John Henry Bell, M.B., to be Lieutenant (on probation), dated June 21, 1910.

Henry Robins Borchers, M.B., to be Lieutenant (on probation), dated July 25, 1910.

### TERRITORIAL FORCE.

#### ROYAL GARRISON ARTILLERY.

*Hampshire.*—Surgeon-Captain Alexander A MacKeith, M.B., to be Surgeon-Major, dated November 1, 1909.

#### ROYAL ENGINEERS.

*Wessex Divisional Engineers.*—Surgeon-Captain Edward Gaved Stocker, from the 2nd Wessex Field Company, Wessex Divisional Engineers, Royal Engineers, to be Surgeon-Captain, dated July 15, 1910.

#### INFANTRY.

*6th Battalion, The Prince of Wales's Own (West Yorkshire Regiment).*—Surgeon-Lieutenant Richard Bladworth, M.B., to be Surgeon-Captain, dated July 14, 1910.

#### ROYAL ARMY MEDICAL CORPS.

*3rd Loveland Field Ambulance.*—Lieutenant David G. Davidson to be Captain, dated June 22, 1910.

*1st East Lancashire Field Ambulance.*—The undermentioned officers are borne as supernumerary whilst serving with No. 18 Field Ambulance, Royal Army Medical Corps, Special Reserve, dated March 7, 1910 :—

Lieutenant-Colonel John B. Mann.

Major William B. Pritchard.

Captain Charles Roberts.

Captain Henry G. Smeeth.

*2nd East Lancashire Field Ambulance.*—The undermentioned officers are borne as supernumerary whilst serving with No. 18 Field Ambulance, Royal Army Medical Corps, Special Reserve, dated March 7, 1910 :—

Major Fred D. Woolley.

Captain George Ashton, M.D.

Lieutenant Thomas Carnwath, M.B.

Charles Henry Stennett Redmond to be Lieutenant, dated May 1, 1910.

*3rd East Lancashire Field Ambulance.*—The undermentioned officers are borne as supernumerary whilst serving with No. 18 Field Ambulance, Royal Army Medical Corps, Special Reserve, dated March 7, 1910 :—

Lieutenant William H. P. Hey.

Quartermaster and Honorary Lieutenant Herbert Dugdale.

*3rd East Anglian Field Ambulance.*—Major and Honorary Surgeon-Lieutenant-Colonel Harry T. Challis, M.D., to be Lieutenant-Colonel, dated June 22, 1910.

*3rd Lowland Field Ambulance.*—Lieutenant James W. Keay, M.D., to be Captain, dated June 1, 1910.

*2nd East Lancashire Field Ambulance.*—Captain Harry Washington Pritchard, from the 3rd East Lancashire Field Ambulance, Royal Army Medical Corps, to be Captain, dated March 7, 1910.

Andrew Walker Buist Loudon, M.D., to be Lieutenant, dated May 10, 1910.

*3rd East Lancashire Field Ambulance.*—Arthur Hastings Hartshorn to be Quartermaster with the honorary rank of Lieutenant, dated March 7, 1910.

*1st Lowland Field Ambulance.*—Lieutenant Ernest Augustus Boxer, from the list of officers attached to units other than Medical Units, to be Lieutenant, dated May 24, 1910.

*2nd Welsh Field Ambulance.*—Captain Evelyn J. R. Evatt, M.B., to be Major, dated June 27, 1910.

*3rd London (City of London) Field Ambulance.*—Quartermaster and Honorary Lieutenant John Wallace Kemp, from the 5th Southern General Hospital, Royal Army Medical Corps, to be Quartermaster, with the honorary rank of Lieutenant, dated May 28, 1910.

*1st Northumbrian Field Ambulance.*—Major (Honorary Lieutenant in the Army) John Clay, M.B., F.R.C.S., to be Lieutenant-Colonel, dated July 9, 1910.

*2nd Northumbrian Field Ambulance.*—Major Lawrence J. Blandford, M.D., to be Lieutenant-Colonel, dated July 9, 1910.

*1st London (City of London) Sanitary Company.*—Joseph Grounds to be Lieutenant, dated May 31, 1910.

#### *Attached to Units other than Medical Units.*

Lieutenant Andrew E. Hodder, M.B., is borne as supernumerary whilst serving with No. 18 Field Ambulance, Royal Army Medical Corps, Special Reserve, dated March 7, 1910.

Lieutenant-Colonel Frederick H. Appleby resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated July 30, 1910.

Lieutenant-Colonel John F. Tabb resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated July 30, 1910.

Lieutenant Alexander Cruickshank, M.B., to be Captain, dated April 1, 1908.

Lieutenant John Stewart resigns his commission, dated August 6, 1910.

Lieutenant Norman S. Carmichael, M.B., resigns his commission, dated August 6, 1910.

Lieutenant Robert H. Gilbert-Bruce to be Captain, dated August 24, 1909.

Lieutenant William J. Cane to be Captain, dated June 15, 1910.

Lieutenant Andrew Currie, M.B., resigns his commission, dated August 10, 1910.

#### *For attachment to Units other than Medical Units.*

William Thomas Blackledge, M.B. (late Captain, 3rd West Lancashire Brigade, Royal Field Artillery), to be Captain, dated January 24, 1910.

Noel Wallace Kidston, M.B., to be Lieutenant, dated May 1, 1910.

Charles Douglas, M.B., to be Lieutenant, dated May 19, 1910.

### **QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.**

*Postings and Transfers.*—Sisters: Miss M. M. Bond, to Royal Herbert Hospital, Woolwich, from Royal Arsenal Hospital, Woolwich; Miss M. Mark, to Netley, from Woolwich. Staff Nurses: Miss M. A. Cachemaille, to Cairo, on arrival in Egypt; Miss M. E. Medforth, to Egypt, from Netley.

*Appointments confirmed.*—Staff Nurses: Miss G. F. V. Temperley, Miss N. Molloy, Miss R. M. Rooke.

*Promotions.*—The undermentioned Sister\* to be Matron: Miss L. E. C. Steen.

The following Staff Nurses to be Sisters: Miss M. J. Hepple, Miss S. Richards, Miss M. B. Williams.

## ROYAL ARMY MEDICAL COLLEGE.

### EXAMINATION FOR COMMISSIONS IN THE ROYAL ARMY MEDICAL CORPS.

*Medicine.*—Case for commentary. Wednesday, July 27, 1910. Commencing 10 a.m. (Time allowed—1½ hours). Read your instructions.

R. H., aged 34, was admitted to hospital, November 1, complaining of pain in his left side; he was pale and anæmic, otherwise he looked healthy and well nourished.

*History.*—The patient had generally been a healthy man, but in the previous July he had been an inmate of the hospital for rheumatism of the larger joints, particularly the knees, when he was treated with the salicylates, and was discharged cured four weeks later. His heart, except for a slight mitral regurgitant murmur, seemed sound. On the present occasion, after a few days' treatment by rest and aspirin, the temperature became normal and the pain in the side was so much relieved that he seemed to be nearly well. Physical examination revealed nothing but a loud systolic murmur of a blowing character in the mitral area, which completely replaced the first cardiac sound and was conveyed round into the axilla, the heart was beating rather forcibly in its normal position. The pulse was regular, 86 in the minute, compressible. Temperature 99·6°. Urine contained some albumen, but there were no tube casts, and the specific gravity was normal. On the 8th the evening temperature was 100·7°. On the following morning he woke up, complaining of inability to turn from his back to the right side, which he said was "numb, painful, and paralysed." He looked pale and was much frightened and excited; temperature 101° and pulse rapid.

On examination it was evident that there was some paresis of the right hand and fore-arm, with a dulling of sensation; the face, tongue, and legs were unaffected. Both motor and sensory functions returned in a few days, and the temperature continued fairly normal up to November 15. On that day, at 10.30 p.m., he suddenly had a severe rigor, the temperature rose to 103°, and fifteen minutes later to 104·6°, pulse 140, respiration 60; he breathed with a slight groan, and complained of severe pain in the right thigh. In twelve hours the pain had passed chiefly to the right foot and great toe. This increase of fever ended in profuse sweating, and the evening temperature fell to 96·2°; he was left very weak and prostrate. The day following it was noticed that pulsation could not be detected in the right dorsalis pedis vessel. On the 17th the pain in the foot was much less acute, but the right groin was acutely tender just inside the femoral artery, although the glands in the femoral region were evident, they were neither enlarged nor tender. Hypodermics of morphia gave relief and sleep. The pain and tenderness in the groin lasted several days and were increased on coughing, otherwise the patient was showing signs of improvement, the temperature being lower and the pain in the foot and toe almost gone, but his pulse kept up and a troublesome cough developed. Physical examination showed crepitations over both lungs, and in front, about the third rib on the left side, there was some want of resonance on percussion and the respiration was vesiculo-tubular. The sputum was mucopurulent, of a tenacious and thick consistence, and when examined microscopically showed large clumps of pneumococci; other cocci were also present. On two subsequent occasions he had a sharp attack of intermittent pyrexia lasting twelve to twenty-four hours, in which the pulse ran up to 200, each attack ending in sweating.

In one of these, sudden severe pain occurred in the left shoulder, the pain <sup>was</sup> increased on movement; in the other, a circular patch of a dusky purple colour <sup>was</sup> found on his right instep.

Death occurred on December 2, the mind being quite clear to the end. There were no special features to be noted about the state of the liver, spleen, bowels, or kidneys, beyond the presence of a little albumen in the urine. The cardiac murmur seemed to be unchanged.

Discuss the foregoing case as to its nature and pathology. Explain the symptoms in the sequence of their occurrence. What further examination would you have made to throw light on the diagnosis? What treatment would you suggest as likely to arrest the disease or to relieve the patient?

*Surgery.*—Case for commentary. Wednesday, July 27, 1910. Commencing 11.30 a.m. (Time allowed, 1½ hours). Read your instructions.

A well-developed man, aged 42, <sup>was</sup> admitted, suffering from constant headache, staggering gait, presents the following history:—

Previous health excellent. In September a persistent general headache came on, most marked in the right frontal and left occipital regions. In November vomiting

began without relation to diet or meals. He felt giddy when in the street and had a tendency to fall forwards and to the left side. At the end of December double optic neuritis developed and his speech became slurring in character with some difficulty in articulation.

There is no history or evidence of otorrhœa, syphilis, or head injury. He has had careful antisyphilitic and other medical treatment without any benefit.

At the present date, January, no area of tenderness can be found in the head. He is lethargic, understands what is said, but is slow in comprehension and reply. There are no Jacksonian symptoms, no spasms, twitchings, or paresis. Co-ordination is poor, he cannot stand or walk unaided. Pulse 100. Temperature normal. Respirations 28.

Discuss the diagnosis, also the various operative procedures for treating the case according to the conditions which might be met with.

#### EXAMINATION OF CAPTAINS FOR PROMOTION TO MAJOR.

*Last of Subjects for Essays.*—Tuesday, July 19, 1910. From 10 a.m. to 1 p.m.

[N.B.—One subject only to be selected.]

*Medical.*—(1) Discuss the diagnostic and therapeutic value of lumbar puncture, and describe the method of performing lumbar puncture.

(2) Discuss the clinical differences between myxedema and exophthalmic goitre, and the treatment of these conditions.

(3) Discuss the causes, physical signs, and treatment of large-lunged emphysema.

*Tropical Medicine.*—(4) Discuss the problem of malarial prophylaxis with special reference to the adaptation of one's practice to (a) a town, (b) a military cantonment, (c) a rural district.

(5) Describe the etiology, pathology, differential diagnosis, and treatment of the principal dysenteries.

*Surgery.*—(1) Write an essay on the pathology and treatment of diseases of the prostate.

(2) Discuss the pathology, symptoms, and treatment of intracranial tumours.

(3) Discuss the pathology, symptoms, and treatment of malignant disease of the large bowel.

(4) Discuss the symptoms and treatment of tubercular disease of the hip joint.

(5) Write an essay on the causes, symptoms, and treatment of aneurysm of the subclavian artery.

(6) Discuss the consequences of laceration of a large nerve trunk. What operations are available for such an injury?

*Medicine (written).*—Tuesday, July 19, 1910. From 2.30 to 5.30 p.m.

(1) Describe a typical attack of renal colic and state what treatment you would adopt. What varieties of renal calculi are met with, and to what symptoms may they give rise?

(2) Under what circumstances may paralysis of the facial nerve occur? Describe the symptoms, course, and treatment of a case of Bell's palsy.

(3) Describe a case of yellow fever and give the appearances which may be met with on autopsy. On what symptoms and post-mortem appearances would you chiefly rely in the diagnosis of the disease? What measures would you adopt in order to prevent or check an epidemic of yellow fever? Describe the signs and symptoms of kala-azar and discuss the differential diagnosis between it and the principal diseases with which it may be confounded.

*Surgery (written).*—Wednesday, July 20, 1910. From 10 a.m. to 1 p.m.

(1) Describe the symptoms and discuss the treatment of a popliteal aneurysm.

(2) In a case of injury to the spine in the lower dorsal and lumbar regions describe the symptoms which would lead you to diagnose—(a) A complete transverse crushing of the cord. (b) A partial lesion of the cord. (c) An injury to or pressure on the cauda equina.

(3) Give the symptoms and treatment of a calculus in the right ureter. With what other affections is it likely to be confounded?

(4) What fractures may occur in the upper third of the humerus? Describe the signs and appropriate treatment of each.

*Military Surgery, Refraction, and Skiagraphy (written).*—(As part of the Examination in Surgery.) Wednesday, July 20, 1910. From 2.30 to 5.30 p.m.

(1) Describe the treatment of a severe gunshot fracture of the upper part of the shaft of the femur, in all its stages. What complications may occur, and how should each be dealt with?

(2) Give the symptoms and treatment of gunshot wounds of the lung, and of their important complications.

(3) Discuss the conditions that determine the exposure required for taking a skiagram.

(4) In a case of obscure injury to the wrist, how would you obtain as full information as possible by means of X-rays? (Details of the methods employed are not asked.)

(5) Give a short account of myopia, including its symptoms, prognosis, and treatment.

### FLORENCE NIGHTINGALE.

On Saturday afternoon, Miss Florence Nightingale passed away at her residence, 10, South Street, Park Lane. Her death was due to heart failure. As the September number of the Journal had already gone to press when this sad event took place, we are unable to do more than refer to the loss which the nation has sustained by the removal of this noble woman. In the next number we hope to give a short biographical sketch of her life.

#### FUNERAL OF MISS FLORENCE NIGHTINGALE, O.M., R.R.C.

##### *Wreath from the Royal Army Medical Corps.*

Arrangements were made to send a wreath, from all ranks of the Corps, Regular, Special Reserve, and Territorial, on the occasion of the funeral of the late Miss Florence Nightingale.

The wreath was composed of white flowers in the form of a chaplet enclosing a design representing the Geneva Cross worn by soldiers of the Corps, the colours being reproduced in the flowers forming it.

A white ribbon, attached, bore the following inscription in gold lettering :—

"From the Officers, Non-commissioned Officers and Men of the Royal Army Medical Corps : a tribute of profound admiration and respect.

"August, 1910."

##### *Wreath from the Queen Alexandra's Imperial Military Nursing Service.*

The wreath sent by Queen Alexandra's Imperial Military Nursing Service consisted of white Asclepias lilies and lilies of the valley surrounding a Dagnar Cross of scarlet carnations.

Attached was a broad scarlet ribbon on which was written in gold letters :—

"In revered and affectionate memory from the Members of Queen Alexandra's Imperial Military Nursing Service."

#### MEMORIAL SERVICE AT ST. PAUL'S CATHEDRAL.

At the Memorial Service on Saturday, August 20, the Medical Services of the Army were represented by :—

The Director-General, accompanied by an officer, Headquarters Staff, a field officer from the Royal Army Medical College and Queen Alexandra Military Hospital, and field officer from the Eastern Command; the Matron-in-Chief, a principal matron, three matrons and two sisters Queen Alexandra's Imperial Military Nursing Service, and one member of the Queen Alexandra's Imperial Military Nursing Service Reserve (no more being available at the time); and the Matron-in-Chief and three members of the Territorial Force Nursing Service. The Indian Medical Service and Queen Alexandra's Indian Nursing Service were also represented.

### BIRTHS.

**BOSTOCK.**—On July 18, to Captain J. S. Bostock and Mrs. Bostock, a son.

**BIRRELL.**—On August 5, at 12, Sutherland House, Cheniston Gardens, W., the wife of Major F. T. F. Birrell, R.A.M.C., of a daughter.

**FOSTER.**—On August 16, at 63, Lower Baggot Street, Dublin, the wife of Captain R. L. V. Foster, R.A.M.C., of a daughter.

**GALWEY.**—On July 7, at Dalhousie, Punjab, the wife of Captain W. R. Galwey, R.A.M.C., of a son.

**WROUGHTON.**—On August 4, at "Boroughfield," Bricket Road, St. Alban's, the wife of Captain A. O. B. Wroughton, R.A.M.C., of a daughter.

## DEATHS.

**HARRISON.**—On July 28, 1910, Honorary Brigade-Surgeon Henry Harrison, retired, late Army Medical Department, aged 73. He entered the Service as Assistant Surgeon on November 16, 1858, served on the Staff, in the Royal Artillery, 46th Foot and Army Medical Department. Became Surgeon March 1, 1873; Surgeon-Major, November 12, 1873; and retired on half-pay with the honorary rank of Brigade-Surgeon on July 21, 1900. His war service was: China War, 1860: Actions of Sinho and Tangku, Capture of Taku Forts, Actions near Tangchow, and Surrender of Peking. Medal with two clasps.

**CAMPBELL.**—At Worthing, Sussex, on June 22, 1910, Surgeon-Lieutenant-Colonel William John Sinclair Campbell, retired pay, late Medical Staff, aged 64. He entered the Service as Assistant-Surgeon on March 31, 1868; became Surgeon March 1, 1873, Surgeon-Major March 31, 1880; Surgeon-Lieutenant-Colonel, March 31, 1888; and retired on retired pay on October 17, 1894. His war service was: Perak Expedition, 1875-6, Medal with clasp; Burmese Expedition, 1895-7, 2 clasps.

**ELGEE.**—At Kingstown, Co. Dublin, on April 11, 1910, Honorary Brigade-Surgeon William Elgee, retired, late Army Medical Department, aged 69. He entered the Service as Staff-Assistant-Surgeon on April 30, 1863; became Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major April 28, 1876; Surgeon-Lieutenant-Colonel, September 30, 1883, and retired with the honorary rank of Brigade-Surgeon on May 12, 1886. His war service was: South African War, 1879; Zulu Campaign. Medal with clasp.

**ANDERSON.**—At Les Islettes, Parame (Ille-et Vilaine), France, on May 9, 1910, Honorary Brigade-Surgeon John Albert Anderson, M.D., retired pay, late Army Medical Department, aged 65. He entered the Army on October 1, 1867, served on the Staff and in the 18th Hussars; became Surgeon Army Medical Department, March 1, 1873; Surgeon-Major October 1, 1879; Surgeon-Lieutenant-Colonel October 1, 1887; and retired on retired pay with the honorary rank of Brigade-Surgeon on November 30, 1887. His war service was: Zulu War, 1879-80; Action at Ulundi. Despatches, *London Gazette*, August 21, 1879. Medal with clasp.

## EXCHANGES, &amp;c.

*The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.*

Lieut., R.A.M.C., due for S. India March, 1911, wishes free exchange to N. India. Address, "D.S.B.," c/o Messrs. Holt & Co., 3, Whitehall Place, London, S.W.

A free issue of twenty-five excerpts will be made to contributors of all articles classified under the heading of Original Communications, Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates:—

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## MANAGER'S NOTICES.

The **JOURNAL OF THE ROYAL ARMY MEDICAL CORPS** is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in March and September of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,

"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"

WAR OFFICE, WHITEHALL, S.W.

## Notices.

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### EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

**All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.**

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S. W.

Communications have been received from Captain J. H. P. Graham, Captain H. E. Ensor, Captain W. S. Nealer, Colonel H. E. R. James, Captain H. E. Gotelee, Lieutenant C. Clarke, Major A. Pearse, Captain A. Tweedie, Captain J. Tobin, Major C. E. Pollock, Captain E. J. Elliot, Lieutenant-Colonel C. Birt, Captain E. G. Ffrench, Major H. V. Prynne.

The following publications have been received:—

*British: Medical Press and Circular, Journal of the Royal Sanitary Institute, The Hospital, The Lancet, Red Cross and Ambulance News. The Australasian Medical Gazette, The Royal Engineers' Journal, The Practitioner, The Medical Review, Army and Navy Gazette, The Journal of Tropical Medicine and Hygiene, Public Health, St. Bartholomew's Hospital Journal, Guy's Hospital Gazette, Transactions of the Society of Tropical Medicine and Hygiene, Sleeping Sickness Bureau, The Pasteur Institute of India, The Middlesex Hospital Journal, Journal of the Royal Institute of Public Health, The Indian Medical Gazette, Journal of the Royal United Service Institution.*

*Foreign: Revista de Sanidad Militar y La Medicina Militar Española, Giornale di Medicina Militare, Archives de Médecine Navale, Le Mois Médical, Archiv. für Schiffs- und-Tropen-Hygiene, Archives de Médecine et de Pharmacie Militaires, The Military Surgeon, Le Caducée, Archives de l'Institut Pasteur de Tunis, Office International d'Hygiène Publique, Deutsche Militärärztliche Zeitschrift, Russian Medical Journal.*

# JOURNAL

OF THE

## ROYAL ARMY MEDICAL CORPS.

### Corps News.

OCTOBER, 1910.

#### ARMY MEDICAL SERVICE.

Lieutenant-Colonel John C. Culling, from the Royal Army Medical Corps, to be Colonel. *vice* D. O'Sullivan, retired, dated August 8, 1910.

#### ROYAL ARMY MEDICAL CORPS.

Captain Ralph Koper White, from the Indian Medical Service, to be Captain, *vice* Arthur A. McNeight, M.B., who exchanges, dated July 11, 1910.

The undermentioned to be Lieutenants on probation, dated July 29, 1910:—

John Darling Bowie, M.B., Charles Henry Hasler Harold, M.D., John Kennedy Gaunt, M.B., Guy Oldham Chambers, Hugh Glencairn Monteith, Eric Leigh Fyffe, M.B., Robert Francis Bridges, M.B., Charles Herbert Stringer, Leslie Ferguson Kennedy Way, Thomas John Hallinan, M.B.

Lieutenant (on probation) Hugh G. Monteith is seconded, under the provisions of Article 900, Royal Warrant for Pay and Promotion, 1909, dated July 29, 1910.

Lieutenant-Colonel William Heffernan retires on retired pay, dated September 3, 1910.

Lieutenant-Colonel Heffernan entered the Army as Surgeon, Army Medical Department on July 31, 1880; became Surgeon-Major, Army Medical Staff, on July 31, 1892; Lieutenant-Colonel, Royal Army Medical Corps, July 31, 1900; Lieutenant-Colonel with higher rate of pay, November 20, 1903.

Captain Leonard Bousfield, M.D., from the Seconded List, is restored to the Establishment, dated August 29, 1910.

Quartermaster and Honorary Lieutenant Arthur J. Pilgrim, R.A.M.C., is granted the honorary rank of Captain, dated August 15, 1910.

**HIGHER RATE OF PAY.**—Lieutenant-Colonel J. Maher has been selected for increased pay from August 8, 1910.

**POSTINGS.**—Major F. J. W. Porter, D.S.O., to the London District, Captain A. F. Carlyon to the Southern Command.

**TRANSFERS BETWEEN COMMANDS AT HOME.**—Major B. W. Longhurst, Eastern Command to Western Command; Lieutenant D. S. Buist, London District to Southern Command.

**APPOINTMENTS.**—Lieutenant Colonel R. R. H. Moore, Charge of Military Hospital, Bulford. Lieutenant Colonel C. Birt, Charge of Royal Military Infirmary, Dublin. Major C. K. Morgan, Instructor, Royal Army Medical Corps School of Instruction, Aldershot. Captain W. M. H. Spiller, Adjutant, Royal Army Medical Corps School of Instruction, West Lancashire Division, Territorial Force. Captain L. Cotterill, Company Officer, Depot Royal Army Medical Corps. Captain R. Storrs, Charge of Families Hospital, Portsmouth.

**RETIRED PAY APPOINTMENT.**—Lieutenant-Colonel B. T. McCreery, Medical Charge at Perth.

**ARRIVALS HOME ON LEAVE.**—Lieutenant-Colonels A. F. Russell, C.M.G., G. F. Gubbin, and H. N. Thompson, D.S.O. Major C. E. P. Fowler. Captains J. W. Leake, E. E. Ellery, W. B. Fry, D. S. B. Thomson, F. F. Roberts, W. J. Weston, C. M. Drew, W. H. Gillatt, W. C. Smales, W. H. Forsyth, J. J. O'Keeffe and W. B. Purdon. Lieutenant W. R. O'Farrell.

**ROSTER FOR SERVICE ABROAD.**—Exchanges have been approved between the undermentioned officers, viz: Lieutenant-Colonels C. Birt and R. H. Hall. Lieutenant-Colonels C. W. Johnson and S. G. Allen. Majors G. T. Rawnsley and G. B. Carter. Majors W. W. O. Beveridge, D.S.O., and W. G. Beyts. Captains R. L. Popham and J. E. H. Gatt.

An exchange of dates of sailing and destination in India between Lieutenant-Colonel G. E. Hale, D.S.O., and Major W. W. O. Beveridge, D.S.O., has been approved.

Major T. J. Lenahan having notified his intention to retire, his name has been removed from the roster

**QUALIFICATIONS.**—Lieutenant A. C. H. Suhr has obtained the Diploma in Public Health of the Royal Colleges of Physicians and Surgeons, England, 1910

### DIVISIONAL STAFF.

To be Principal Medical Officer, 8th (Lucknow) Division —  
Surgeon-General J. G. MacNeece, British Service, dated July 24, 1910.

INDIA OFFICE,  
September 2, 1910,

### EMBARKATIONS.

*India Northern Army.*—Major W. Hallaran, Lieutenants T. J. Mitchell, D. H. C. MacArthur, H. Gall, A. W. Byrne.

*India Southern Army.*—Lieutenants J. C. L. Hingston, G. G. Collet, J. B. Jones, J. Startin.

*Gibraltar.*—Captains G. R. L. Ronayne, A. W. Gibson.

*Malta.*—Captains J. A. Hartigan, C. Clarke, A. R. Wright.

*Strait Settlements.*—Captains H. G. Pinches, R. Rutherford, E. V. Vaughan

*Egypt.*—Major T. B. Beach, Lieutenants S. McK. Saunders, H. H. Leeson.

*Ceylon.*—Lieutenant F. Worthington.

*South China.*—Majors C. M. Fleury, F. S. Penny.

*North China.*—Lieutenant-Colonel J. M. Irwin.

**NOMINAL ROLL OF ROYAL ARMY MEDICAL CORPS OFFICERS ARRIVING IN INDIA FROM ENGLAND DURING THE TROOPING SEASON OF 1910-11, SHOWING THE DIVISIONS TO WHICH THEY HAVE BEEN ALLOTTED.**

NORTHERN ARMY		SOUTHERN ARMY	
Rank and Name	Division	Rank and Name	Division
Lieut.-Col. R. W. Wright	8th Lucknow	Lieut.-Col. F. W. C. Jones	4th Quetta
Major E. G. Browne ..	7th Meerut	" G. E. Hale,	5th Mhow
" W. Hallaran ..	3rd Lahore	" D.S.O.	
" W. H. S. Nickerson, V.C.	2nd Rawalpindi	" C.T. Blackwell	9th Secunderabad
" H. B. G. Walton ..	7th Meerut	Major F. R. Buswell ..	5th Mhow
Captain W. B. Winkfield	7th "	" S. J. C. P. Perry ..	6th Poona
" J. G. Foster ..	2nd Rawalpindi	" G. E. F. Stammers	4th Quetta
" B. S. Bartlett ..	3rd Lahore	" H. G. F. Stallard ..	5th Mhow
" H. F. Shea ..	8th Lucknow	Captain F. Ashe ..	9th Secunderabad
" J. T. Johnson ..	7th Meerut	" W. C. Croly ..	9th "
" W. R. P. Goodwin	8th Lucknow	" C. H. Furnivall	9th "
" A. C. Duffey ..	7th Meerut	" J. F. Whelan ..	5th Mhow
" H. E. J. A. Howley	8th Lucknow	" E. G. French ..	6th Poona
" J. W. West ..	3rd Lahore	" F. W. Lambelle	5th Mhow
" S. M. Abye-Curran	2nd Rawalpindi	" G. F. Rugg ..	4th Quetta
" J. H. Spencer ..	3rd Lahore	Lieut. J. C. L. Hingston	9th Secunderabad
" F. W. W. Dawson	7th Meerut	" D. S. Buist ..	4th Quetta
Lieut. D. H. C. MacArthur	3rd Lahore	" A. M. Pollard ..	4th "
" T. J. Mitchell ..	3rd "	" G. G. Collett ..	9th Secunderabad
" D. E. C. Pottinger	7th Meerut	" C. H. O'Rourke ..	Burma
" H. Gall ..	3rd Lahore	" J. Startin ..	9th Secunderabad
" A. W. Byrne ..	3rd "	" C. G. Sherlock ..	8th Lucknow
" J. B. Jones ..	7th Meerut	" S. W. Kyle ..	5th Mhow
		" J. W. Lane ..	5th "
		" W. G. Wright ..	6th Poona
		" A. T. J. McCreery	5th Mhow

**LIST OF TOUR-EXPIRED OFFICERS OF THE ROYAL ARMY MEDICAL CORPS  
SERVING IN INDIA, DETAILED TO EMBARK FOR ENGLAND IN THE  
SEVERAL TRANSPORTS TO WHICH THEY HAVE BEEN ALLOTTED  
DURING THE TROOPING SEASON, 1910-11.**

Transport and date of sailing	Rank and name	Division or Brigade	Remarks
1st Transport "Rewa," October 6, 1910, from Bombay	Lieut.-Col. G. Cree ..	9th (Secunderabad)	In medical charge.
	Capt. R. J. Cahill ..	" "	Doing duty.
2nd Transport "Dongola," October 20, 1910, from Bombay. (Leaves Aden, October 25, 1910)	" E. J. H. Luxmoore	7th (Meerut) ..	" "
	Major F. J. C. Heffernan. F.R.C.S.I.	8th (Lucknow)	In medical charge.
	Capt. S. C. Bowle ..	6th (Poona) ..	Doing duty.
	" E. G. R. Lithgow	Aden ..	" "
3rd Transport "Plassy" (Cot Ship), November 3, 1910, from Bombay	Lieut.-Col. T. B. Winter	7th (Meerut) ..	In medical charge.
	Capt. G. A. Kempthorne	3rd (Lahore) ..	Doing duty.
	" C. H. Turner ..	2nd (Rawalpindi)	" "
	" K. A. C. Doig ..	7th (Meerut) ..	" "
	" J. P. Lynch ..	" "	" "
4th Transport "Rewa," December 2, 1910, from Karachi	Lieut.-Col. W. E. Berryman	8th (Lucknow)	In medical charge.
	Capt. W. F. Ellis ..	3rd (Lahore) ..	Doing duty.
	" H. T. Wilson ..	2nd (Rawalpindi)	" "
	" L. V. Thurston ..	1st (Peshawar)	" "
5th Transport "Dongola," December 17, 1910, from Karachi	Lieut.-Col. A. E. Morris	5th (Mhow) ..	In medical charge.
	Capt. A. B. Smallman ..	4th (Quetta) ..	Doing duty.
	" J. E. Powell ..	7th (Meerut) ..	" "
	" A. W. Gater ..	3rd (Lahore) ..	" "
	Major H. A. Hinge ..	9th (Secunderabad)	In medical charge.
6th Transport "Plassy" (Cot Ship), January 5, 1911, from Bombay	Capt. R. K. White ..	8th (Lucknow)	Doing duty.
	" E. B. Booth ..	5th (Mhow) ..	" "
	" W. G. Maydon ..	9th (Secunderabad)	" "
	" "	" "	" "
7th Transport "Rewa," February 2, 1911, from Karachi	Lieut.-Col. J. Meek ..	4th (Quetta) ..	In medical charge.
	Capt. G. H. J. Brown ..	7th (Meerut) ..	Doing duty.
	" M. C. Wetherell ..	" " "	" "
8th Transport "Dongola," February 22, 1911, from Bombay (Leaves Aden, February 27, 1911)	" G. Ormrod ..	" " "	" "
	Major C. A. Stone ..	9th (Secunderabad)	In medical charge.
	Capt. J. H. Campbell ..	8th (Lucknow)	Doing duty.
	" G. B. F. Churchill	Burma ..	" "
	" C. W. O'Brien ..	Aden ..	" "
9th Transport "Plassy" (Cot Ship), March 10, 1911, from Bombay	Bt. Lieut.-Col. O. R. A. Julian, C.M.G.	3rd (Lahore) ..	In medical charge.
	Capt. N. Low ..	9th (Secunderabad)	Doing duty.
	" W. S. Nealor ..	Burma ..	" "
	" J. E. Hoar ..	9th (Secunderabad)	" "
10th Transport "Rewa," March 31, 1911, from Karachi	Capt. C. G. Thomson ..	3rd (Lahore) ..	In medical charge.
	" A. A. Meaden ..	5th (Mhow) ..	Doing duty.
	" R. H. L. Cordner	2nd (Rawalpindi)	" "

The following additional tour-expired officers have been omitted from the above list:—

Lieutenant-Colonel G. F. Gubbin,\* Lieutenant-Colonel L. W. Swabey (on leave ex-India pending retirement), Major A. H. Waring,\* Captain P. Dwyer,\* and Captain H. O. M. Beadnell.\*

**NOTES FROM ALDERSHOT.**—Serjeant-Major Roberts writes; “The following items will interest many who have served at the Connaught Hospital:—

“Captains G. A. K. H. Reed, G. S. Wallace, and P. G. Easton have recently arrived from the Royal Army Medical College for duty, Lieutenant W. B. Rennie has proceeded to Decept in relief of Lieutenant J. Startin, who is under orders for abroad.

“Quartermaster and Honorary Captain F. W. Hall, R.A.M.C., will shortly proceed to South Africa for duty, on being relieved by Quartermaster and Honorary Captain R. R. Cowan from Shorncliffe.

“Miss J. Connell, Staff Nurse, Queen Alexandra's Imperial Military Nursing Service, has arrived here for duty.

“Serjeant-Major G. H. Roberts arrived here from Woolwich on August 5, for duty, in relief of Serjeant-Major F. E. Collard, who proceeds to Malta for duty.

“Serjeant-Major T. McColgin has been placed under orders to proceed to Mauritius for duty; he has been relieved by Serjeant-Major Bollen, from Lichfield.

“Serjeant-Major Tod from Netley has arrived at Aldershot for duty as a successor to Serjeant-Major E. W. Newland, Clerk to Principal Medical Officer, Aldershot Command.

“Serjeant-Major Roberts passed in “Administration, Organization, and Equipment” at the last examination.

“The following have been warned to proceed abroad at an early date: 12518 Corporal H. Gale, to Egypt; 17464 Corporal N. J. Emery, to Gibraltar, 15738 Corporal H. Brough, to Tientsin; 2144 Private H. Tasker, to Tientsin; 1383 Private C. Licence, to Singapore; 1519 Private W. J. Price, to South Africa; 4547 Private G. A. Lynn, to Egypt.

“Major-General S. H. Lomax, commanding 1st Division, made his first inspection of No. 2 Company, Royal Army Medical Corps, on August 30, and expressed satisfaction at their smart appearance. After visiting the hospital, he exclaimed, ‘What a charming hospital,’ a remark well deserved.

#### FAREWELL CONCERT TO OLD COMRADES.

“On Tuesday evening the Serjeants’ Mess was filled to overflowing on the occasion of a farewell concert to Staff-Serjeants Forman and O’Connor, who were retiring from the service on pension. Serjeant-Major E. Newland presided over the proceedings, and he was supported on either side by a large number of officers, including Lieutenant-Colonel F. M. Wilson, C.B., C.M.G., D.S.O. Of the programme there can be only one thing said—it was excellent, and was only equalled by the completeness of the arrangements made by an able committee, under Serjeant Muirhead. From eight o’clock till midnight the concert progressed with an unflagging interest, and the company thoroughly enjoyed the proceedings. The toast list was short, and besides that of ‘The King’ there was only one other submitted, that of ‘The Guests of the evening,’ given by the Chairman in brief but hearty terms. He had to apologise for the absence of Staff-Serjeant Forman, who was unavoidably prevented from attending the concert. They all knew, said the Chairman, the object of the gathering, and Staff-Serjeant O’Connor was so well known that he did not need introduction. Both non-commissioned officers were old and popular members of the mess, and were great supporters in everything the corps undertook. He was sure they would be missed by every one. Before asking them to drink to the toast, he had a pleasant duty to perform, and that was to present to Staff-Serjeant O’Connor a silver mounted salad bowl on behalf of the members of the mess, in token of the esteem in which he was held by his comrades. “The toast was received with musical honours, and Staff Serjeant O’Connor suitably replied.

“The concert then proceeded, Bandsman Large doing excellent service at the piano. Serjeant Dixon was the first to start the programme, and he was loudly applauded for his song, ‘Rose of my Life.’ He received a similar ovation after singing ‘Thora,’ for which he received a most deserving encore. Serjeant-Major Collard sang ‘Killarney’ and ‘Tom Bowling,’ and Serjeant Muirhead sang ‘Asleep on the Deep’ and ‘The Wolf,’ in very good style. Corporal Cairns, who was suitably ‘got up’ for

\* On leave from India to revert to home Establishment on expiration of leave.

the occasion, sang 'Don't take me Home,' the chorus of which was taken up with gusto. Later he sang 'The Little Pub,' and for this he was again encored, cracking some 'chestnuts,' which, however, went down well. Serjeant Sims sang 'The Dear Old Home,' and 'Farmer Giles,' and Quartermaster-Serjeant Taylor rendered 'Ashore' and 'Marguerite' very sweetly, receiving enthusiastic applause. Corporal Stafford and Mr. Bert Styles were the star comics of the evening, and both were repeatedly encored. The former gave 'Dinkey Doo,' 'Can London do without Me?' and 'Come and have a Drink with Me,' and he also appeared with two 'others' as Stafford and Co. in a somewhat impromptu sketch, entitled the 'Adventures of Crippen.' While this was in progress the company were bursting with laughter. Mr. Styles fell in a 'Cyder' Sea, and the company thoroughly enjoyed 'pulling' him out. He also gave several other contributions. Captain Cotterill sang 'Flight of Ages,' and for an encore gave 'Down the Vale,' and Quartermaster-Serjeant Owen and the Chairman were among many others who obliged. A thoroughly enjoyable evening was brought to a close with the 'National Anthem.'

"No. 2 Company have now finished their cricket programme for the season, and although they were considerably handicapped by several changes in the team, caused by service conditions, they met with a fair amount of success. Appended are some of the averages.—

#### BATTING.

Name	No. of Inns.	Most in an Inns.	Times not out	Total	Average
Corpl. Emery .. .. .	10	55*	2	154	19.25
„ Tollafield .. .. .	4	23*	1	46	15.33
Lance-Corpl. Staff .. .. .	7	40	0	99	14.14
Pte. Griffiths .. .. .	13	17	1	71	5.46
„ Price .. .. .	12	23	1	53	4.81
Corpl. Fish .. .. .	4	10	0	19	4.75
Pte. Walkley .. .. .	13	30	0	86	6.61
„ Gardner .. .. .	13	19	1	56	4.30

#### BOWLING.

Name	Wickets	Runs	Average
Pte. Gardner .. .. .	8	42	5.25
Sgt. Avery .. .. .	12	79	6.58
Sgt.-Maj. Roberts .. .. .	5	32	6.40
Sgt. Miller .. .. .	29	199	6.86
Pte. Ellis .. .. .	24	94	6.71
„ Mathias .. .. .	24	168	7.09
„ Walkley .. .. .	10	160	16.90
Corpl. Emery .. .. .	7	138	19.71
„ Tollafield .. .. .	2	41	20.50

"The season closed with a visit to Eversley Cross, a delightful sylvan retreat in Berkshire, about 10 miles from Aldershot. The team drove there and back, thoroughly enjoying the beautiful surrounding country, the day being an ideal one. Our opponents were successful by a substantial margin, chiefly owing to the efforts of Mr. Hearman, who contributed 44 runs. His performance was, however, marred by several chances that were not accepted. For the losers, Serjeant-Major Roberts took 5 wickets for 32 runs.

"After being most hospitably entertained, all members returned home, thoroughly pleased with their outing.

On September 2, members of the Serjeants' Mess were 'at home' to members of the Corporals' Mess. The meeting took place on the Corps Sports Ground, a most up-to-date enclosure, the day being an ideal one for sport. Games of cricket and tennis were participated in, the Corporals winning the cricket match somewhat easily. Refreshments of all kinds were liberally supplied. To the strains of music supplied by the Corps band, many of both sexes indulged in the terpsichorean art until the shades of night appeared, when all wended their way homewards, apparently very pleased.

"A pleasant little function took place on the night of September 5, in the Serjeants' Mess of the 2nd Royal Dublin Fusiliers, the occasion being the departure of Serjeant-Major Collard to Malta. A most excellent programme, both musical and otherwise, was given; in fact, the proceedings were the most diverting one could wish for, the spontaneous humour displayed by the 'dual chairman' being splendid. The company present all agreed that their risible faculties had never been so violently exercised before.

"The continuous hospitality of the President and members of the 2nd Royal Dublin Fusiliers' Mess to our Corps was specially evinced on this occasion by their scratching their own arrangements for this function. This goodwill and the appreciation of the Unit for Serjeant-Major Collard was cordially expressed by the Chairman.

"On behalf of the Sergeants and Corporals No. 2 Company, Royal Army Medical Corps, Serjeant-Major Roberts handed to Serjeant-Major Collard a serviceable present in the shape of a shaving outfit. In doing so he made a few complimentary remarks concerning the recipient, to which the latter feelingly responded."

**NOTES FROM SIMLA.**—Lieutenant-Colonel R. S. F. Henderson, V.H.S., R.A.M.C., Secretary to Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated August 17, 1910:—

**"Appointments.**—The following officers have been appointed to the command of station hospitals noted:—

"Lieutenant-Colonel G. G. Adams, Colaba.

"Lieutenant-Colonel S. C. Philson, Bareilly.

"Lieutenant-Colonel G. H. Bar-foot, Ranikhet

"Colonel W. G. Macpherson (not yet joined) will be appointed Principal Medical Officer, 4th (Quetta) Division, *vice* Colonel D. O'Sullivan retired, Senior Medical Officer on the spot officiating

"Colonel M. W. Kern, Principal Medical Officer, Bareilly, Garhwal, and Dhera Dun Brigades, appointed to officiate as Principal Medical Officer, 7th (Meerut) Division, *vice* Colonel F. B. Maclean on leave, Senior Medical Officer on the spot officiating as Principal Medical Officer, Bareilly, Garhwal and Dhera Dun Brigades, *vice* Colonel M. W. Kern.

**"Retirements.**—Colonel D. O'Sullivan, Principal Medical Officer 4th (Quetta) Division, retired from the Service, with effect from August 8, 1910.

**NOTES FROM WOOLWICH.**—Serjeant-Major Green writes under date September 21: "Our Annual Company Sports were held on August 8, in the grounds of the Royal Herbert Hospital, and were a success from all points of view. The weather could not have been more favourable than it turned out. The entries numbered 294, which shows the keenness displayed by the companies. The result was that the events were very well come to. The prize list was most generously subscribed to by the officers, and this was supplemented with funds from our Recreation Club, so that we were able to have a fine show of prizes for competition. Preliminary heats had been run off previously. The finals were commenced at 11 a.m., and except for an interval of an hour from 12 to 1 p.m., the programme was kept in continual swing up to 7.30 p.m. The list of events and winners were as follows:

1 mile flat race: 1st, Pte. G. Harding (inkstand, presented by Lieut.-Col. Irwin); 2nd, Pte. Warner (clock with elephant stand); 3rd, Pte. Roe (hall set of brushes).

Half-mile flat race: 1st, Pte. G. Harding (carriage clock, presented by Major Jones); 2nd, Pte. Warner (case of razors); 3rd, Pte. Henry (safety razor complete).

Quarter mile flat race: 1st, Pte. Graves (gilt clock, R.A.M.C. Territorials); 2nd, Pte. Spicer (set of hair-brushes, R.A.M.C. Territorials); 3rd, Pte. Henry (inkstand).

220 yards flat race: 1st, Pte. Harding (dressing case, presented by Capt. J. M. M. Crawford); 2nd, Pte. Snow (field glasses); 3rd, Pte. Warner (silver pencil case).

150 yards flat race: 1st, Pte. Brunton (dressing case); 2nd, Pte. Leonard (clock); 3rd, Pte. Henry (silver pencil case).

Relay Race: 1st team, Ptes. Harding, Eaton, and Leonard (razor in case each).

Boot Race: 1st, Corpl. Sparks (calendar block).

Three legged race: 1st, Ptes. Hort and Stowe (walking stick each); 2nd, Ptes. Harding and Passingham (walking stick each).

Throwing cricket-ball: 1st, Sergt. Doll (clock with elephant stand); 2nd, Pte. Steedman (cigarette case).

High jump: 1st (height, 4ft. 8in.), Pte. Pettitt (shaving mirror and set); 2nd (height, 4ft. 7in.), Pte. Whitbread (razor in case).

Long jump: 1st, Pte. Walsh (cigarette holder in case); 2nd, Pte. Eaton (tobacco pouch).

Putting the shot: 1st, Corpl. Campion (hall set of brushes); 2nd, Pte. Kirby (clock).

Potato race: 1st, Pte. Whitbread (gilt clock); 2nd, Pte. Eaton (cigarette case); 3rd, Pte. Warner (tobacco pouch).

Kicking the football: 1st, Pte. Horsnell (inkstand); 2nd, Pte. Garvey (shaving set).

Slow cycle race : 1st, Pte. T. Harding (bicycle lamp) ; 2nd, Sergt. Ellis (inkstand).  
Soda and bun race : 1st, Pte. Andrews (cigarette case) ; 2nd, Pte. Warner (fountain pen).

Egg-and spoon costume race : 1st, Pte. Kirby (case of razors) ; 2nd, Pte. Welch (set of hair brushes).

Sack race : 1st, Pte. Sims (safety razor).

Bucket of water race : 1st, Pte. Dorman (fountain pen).

Veterans' race : 1st, Pte. Billington (gilt clock) ; 2nd, Pte. Snow (barometer) ; 3rd, Corpl. Campion (writing desk).

Prize ring : 1st, Pte. Kerby (writing desk).

Cuddy fighting : 1st, Ptes. Whitbread and Brunton (fountain pen each).

Mop fighting : 1st, Ptes. Brunton and Whitbread (walking stick each) ; 2nd, Ptes. Reid and Thomas (walking stick each).

Tug-of-war : No. 1 Barrack Room Winners—Ptes. Whitbread, Welch, Horsnell, Grimley, Emery. Priest, Reid, and Burlinson (four cigarette cases and four pipes in cases).

Consolation race : 1st, Pte. Rodber (cigarette holder in case) ; 2nd, Sergt. Thomson (photo frame).

Ladies' thread-and-needle race : 1st, Mrs. Hunt (Chinese glove box, presented by Capt. Douglas, V.C., D.S.O.) ; 2nd, Mrs. Wooten (vanity bag) ; 3rd, Mrs. Steele.

Ladies' egg-and-spoon race : 1st, Mrs. Hunt (work basket) ; 2nd, Mrs. Arnold ; 3rd, Mrs. Godman.

Girls' Race : 1st, Janet McClay ; 2nd, Winnie Green ; 3rd, Dolly Arnold.

Girls' thread-and-needle race : 1st, Mona Godman ; 2nd, Winnie Green ; 3rd, Dora Godman.

Boys' Race : 1st, Alec Clark ; 2nd, Alan Parton ; 3rd, Fred Smith.

"The Royal Artillery Band, about fifty strong, discoursed the following excellent programme in the afternoon to the delight of all present:—

1	<i>March</i>	..	..	..	"A Bunch of Roses"	..	..	..	..	<i>Chap.</i>
2	<i>Overture</i>	..	..	..	"Light Cavalry"	..	..	..	..	<i>Suppe.</i>
3.	<i>Serenade</i>	..	..	..	"O Sole Mio"	..	..	..	..	<i>In Capna.</i>
4	<i>Selection</i>	..	..	..	"The Arcadians"	..	..	..	..	<i>Monckton-Talbot.</i>
5.	<i>Yalse</i>	..	..	..	"Septembre"	..	..	..	..	<i>Godin.</i>
6.	<i>Polonaise</i>	..	..	..	"Masken"	..	..	..	..	<i>Faus.</i>
7.	<i>Selection</i>	..	..	..	"A Life on the Ocean"	..	..	..	..	<i>Binding.</i>
8	<i>Finale</i>	..	..	..	"Nigger's Birthday"	..	..	..	..	<i>Lincke.</i>

GOD SAVE THE KING.

"The members of the Sergeants' Mess were 'At home,' and entertained some 150 guests, whilst the rank and file also had tea prepared for their friends, and entertained about a similar number.

"Considerable amusement was caused during the afternoon by our comic men, Privates Welch, Kerby, and Brunton, whose 'get-ups' were quite original, and their antics equally so. Screams of laughter were evinced during the soda and bun, sack, bucket of water, and boot races, also the cuddy and mop fighting (no quarter was given in the last two). The prize ring event was well manœuvred between Privates Brunton and Kerby, who knocked out about twenty other competitors between them, and then gave a good display in the final, Private Kerby eventually winning.

"Among those present were: Lieutenant-Colonel J. M. Irwin (Acting A.M.O.) and Mrs. Irwin, Lieutenant Colonel J. B. Wilson and Mrs. Wilson, Lieutenant-Colonel C. T. Blackwell, Major T. McDermott, Major T. P. Jones (Commanding Companies) and Mrs. Jones, Major R. H. Fuhr, D.S.O., and Mrs. Fuhr, Major Cowen, Captain H. E. M. Douglas, V.C., D.S.O., Captain H. A. Bransbury, Captain A. J. Williamson, Captain N. E. Dunkerton,\* Lieutenant and Mrs. James, Lieutenant S. McK. Saunders, Lieutenant K. Comyn, Lieutenant and Quartermaster and Mrs. Clark.

"Major Jones, Lieutenant Saunders, Serjeant-Major Green, and Serjeant Knott acted as judges and starters.

"The Committee were as follows: President, Major T. P. Jones; Members: Captain T. E. Harty, Serjeant-Major R. H. Green, Sergeants Dell, Knott, Thompson; Corporals Campion, Gurnsey, and Blong; Privates Breeds, Cairns, Croker, Eaton, Marshall, Walsh, and Whitbread.

"The prizes were kindly distributed at the close of the sports by Mrs. Irwin, assisted by Mrs. Jones, the recipients coming in for an ovation of clapping and cheering.

**" AT HOME.**

"Mrs. Jones was 'at home' to the wives of the W.O.'s, N.C.O.'s, and men on August 25, in ideal weather, at Herbert House, the residence of Major T. P. Jones, the Registrar.

"An excellent tea was provided in a large marquee pitched at one end of the lawn. Strewn about the remainder of the lawn were garden chairs, seats, &c., and in one corner was an improvised stage, and with plenty of bunting about, the grounds presented quite a picturesque appearance.

"Following tea there was a vocal entertainment, which was much appreciated, and then an open-air sketch, 'The Brown Paper Parcel,' in which Mrs. Irwin and Mrs. Bray acted their parts as the respective Misses Brown in excellent style, and to the very evident amusement of those present.

"After the sketch there was a jumble auction, which caused great fun and an almost continuous stream of merriment. Major Bray excelled in the part of auctioneer in describing the merits or demerits of the articles to be sold. The bidding, though a little slow at the commencement, and accompanied by smiles, soon took a turn the other way about, and became very brisk towards the end and accompanied by boisterous laughter.

"Many were the thanks of the guests for an exceedingly sociable, novel, and enjoyable entertainment, towards the success of which a lot of time and trouble must have been devoted by Mrs. Jones."

**PROMOTIONS.**

11417 Serjeant A. Bush, August 19, 1910, to be Staff-Serjeant (special under para. 351, K.R.); 8532 Serjeant H. G. Collins, August 30, 1910, to be Staff-Serjeant (special under para. 351, K.R.); 11403 Serjeant R. E. Wagstaffe, September 5, 1910, to be Staff-Serjeant (special under para. 351, K.R.)

**DISCHARGES.**—7232 Quartermaster-Serjeant E. Hunt, August 31, 1910, to pension; 9703 Staff-Serjeant W. B. Heponstall, August 31, 1910, medically unfit; 8523 Staff-Serjeant S. Gregg, August 20, 1910, termination of second period; 8516 Serjeant G. S. Harrington, August 20, 1910, termination of second period; 8531 Serjeant W. James, August 29, 1910, termination of second period; 8540 Staff-Serjeant F. C. E. Godbolt, September 4, 1910, termination of second period; 16196 Corporal A. A. Tornley, September 13, 1910, medically unfit; 17280 Corporal A. Lindford, September 13, 1910, medically unfit; 9451 Private A. M. Caesar, August 31, 1910, medically unfit; 19258 Private R. Brown, July 31, 1910, on payment of £25; 12558 Private C. Price, September 4, 1910, medically unfit; 4490 Private W. Fitzpatrick, September 10, 1910, medically unfit; 8543 Private G. Thorogood, September 5, 1910, termination of second period; 11994 Corporal W. Myatt, September 9, 1910, termination of first period.

**TRANSFERS TO ARMY RESERVE.**—17835 Private W. Bates, August 11, 1910; 17842 Private E. Ainsworth, August 12, 1910; 17866 Private P. J. Burns, August 14, 1910; 17869 Private W. Pulling, August 18, 1910; 17853 Private W. Douglas, August 15, 1910; 17863 Private E. Whitehead, August 19, 1910; 17871 Private H. Halstead, August 21, 1910; 17879 Private J. Stewart, August 27, 1910; 17883 Private A. Highman, August 25, 1910; 17888 Lance-Corporal M. Scott, August 25, 1910; 1188 Private M. Doyle, August 25, 1910; 1554 Private R. E. Goldsbrough, August 27, 1910; 17905 Private E. Cornell, September 2, 1910; 17917 Private A. MacLeod, September 3, 1910; 17900 Private E. J. Loashy, September 3, 1910; 17907 Private J. E. Hobson, September 4, 1910.

**TRANSFERS FROM OTHER CORPS.**—5075 Private F. Jones, August 11, 1910, from Army Service Corps; 5076 Private F. H. Phillips, August 15, 1910, from Army Service Corps.

**TRANSFERS TO OTHER CORPS.**—10831 Serjeant H. W. G. Gregory, August 11, 1910, to Territorial Force; 15955 Serjeant H. G. Miller, August 17, 1910, to Colonial employ; 4559 Private B. E. Barker, September 1, 1910, to 8th Hussars.

To Malta, per H.T. "Soudan," September 6, 1910; 8366 Serjeant-Major F. E. Collard,

**EMBARKATIONS FOR ABROAD.**

18335 Lance-Corporal H. J. Woolway, 10727 Private H. Dickinson, 1405 Private J. Tipping, 2117 Private L. H. Ives, 1914 Private C. Dugmore, 1920 Private E. E. Ford, 1700 Private E. Waterfield, 18049 Private O. G. Bloomfield, 1668 Private G. H. F. Drew, 1790 Private F. R. Wilkes, 4353 Private G. Newman, 17401 Private H. J. Wright.

To Egypt, per H.T. "Soudan," September 6, 1910: 18634 Serjeant F. H. Galton, 17736 Corporal J. D. Keeble, 12516 Corporal H. Gale, 18458 Private C. H. Rhodes, 1682 Private H. L. Emery, 1598 Private E. E. Bryant, 1440 Private G. Johnson, 1102 Private J. G. Hake, 1643 Private F. H. Mattock, 1622 Private M. D. Yeam, 1757 Private H. J. Marshall, 1072 Private H. A. French, 1426 Private A. G. Pike, 1216 Private J. Dunne.

To Gibraltar, per H.T. "Soudan," September 6, 1910: 17464 Corporal M. J. Emery, 1663 Private H. C. Furniss, 1988 Private H. Rhodes, 17539 Private A. Watkins, 1670 Private A. C. Farley.

To Singapore, per H.M.T. "Rohilla," September 9, 1910: 8111 Serjeant-Major W. E. Eate, 11082 Staff-Serjeant J. Fraser, 18569 Corporal C. Colbert, 18433 Corporal J. A. Shaw, 18157 Lance-Corporal A. Pruden, 18509 Lance-Corporal J. McFarland, 1099 Private A. Walton, 1364 Private W. E. Glanville, 1368 Private A. Bunker, 2226 Private F. J. Chatting, 1483 Private C. Licence.

To Tientsin, per H.M.T. "Rohilla," September 9, 1910: 11141 Quartermaster-Serjeant T. E. Coggon, 15738 Corporal H. Brough, 19385 Private H. Johnson, 2232 Private W. S. A. Cooke, 1527 Private S. E. Way, 2144 Private H. Tasker.

To Ceylon, per H.M.T. "Rohilla," September 9, 1910: 17696 Corporal S. Collins, 17977 Corporal D. Davis, 17826 Private T. Malone, 2003 Private E. R. Fullbrook, 1304 Private C. F. Rowe, 1970 Private W. J. G. Brunt, 1135 Private E. McGill.

To Hong-Kong, per H.M.T. "Rohilla," September 9, 1910: 12259 Serjeant J. Worswick, 17759 Serjeant J. Black, 18122 Lance-Serjeant J. A. Kirby, 17497 Corporal F. Genge, 16259 Corporal W. Thomson, 1793 Private R. R. Gilbert, 1584 Private W. E. Phillips, 1583 Private S. G. Elston, 1141 Private H. A. Dyson, 1751 Private F. H. Plaum, 1652 Private S. Hare, 1475 Private W. J. Bamford, 1630 Private E. Riley, 1375 Private H. Shipton, 1569 Private G. L. Farmer, 18832 Private G. Heard.

#### **DISSEMBARKATIONS FROM ABROAD.**

From Mauritius (invalided), per ss. "Comrie Castle," August 20, 1910: 12053 Serjeant W. Ross.

From Gibraltar, per H.M.S. "Formidable," August 13, 1910: 17280 Corporal A. Lindford, 16196 Corporal A. A. Tomley, 18733 Private A. McKenzie, 18656 Private H. G. Maywood.

#### **DEATHS.**

16822 Serjeant H. W. Whipp, August 30, 1910, at Parkhurst, Isle of Wight.

#### **THE FOLLOWING N.C.O.'s AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.**

*For Quartermaster-Serjeant.*—10089 Staff-Serjeant S. C. R. Chester.

*For Staff-Serjeant.*—12441 Serjeant L. Hubbard, 9578 Serjeant W. Dawson, 15591 J. Harris.

*For Serjeant.*—10336 Lance-Serjeant F. J. Howell, 12756 Corporal F. H. Jones, 12411 Corporal A. A. Sims, 12651 Corporal R. H. Bennett, 19322 Corporal H. Elliott 17926 Corporal J. F. Winter, 17987 Corporal A. Betts, 17541 Corporal P. McConn.

*For Corporal.*—18600 Private A. Grimsdall, 153 Private G. T. Richardson, 12432 A. Ward, 19517 Private R. G. Harrison, 2007 Private A. F. Morrell, 19023 Private A. Tarbet, 16155 Private G. Clarke, 19757 Private V. Rickard, 144 Private S. W. Wood, 10044 Private C. W. Hickman, 12627 Private H. Borland, 14437 Private G. Sadler, 19827 Private J. W. Baxter, 19913 Private T. S. Roberts.

Mr. M. Sloper, late 9224 Serjeant, Royal Army Medical Corps, who was employed in the Medical Department of Northern Nigeria, was accidentally drowned on August 6, very near Burutu in Southern Nigeria.

Serjeant E. A. Lane's appointment with the Medical Department of Northern Nigeria has been extended for a further tour.

#### **SPECIAL RESERVE OF OFFICERS.**

##### **ROYAL ARMY MEDICAL CORPS.**

The undermentioned Lieutenants are confirmed in that rank: Alexander C. McKillop, M.B.; John Inkster, M.B.; Gordon R. Ward; Aston R. Dale; Mark Anthony; Ronald Mackinnon, M.B.; Stephen Gordon; George E. Shand, M.B.; Sidney J. Stewart, M.D.; George B. McCaul, M.D.; George F. Randall; Edward T. Holland.

*No. 18 Field Ambulance.*—The name of Lieutenant Wilson H. P. Hey is as now described, and not as stated in the *Gazette* of July 8, 1910.

The name of Lieutenant Sidney J. Steward, M.D., is as now described, and not as stated in the *Gazette* of August 19, 1910.

### TERRITORIAL FORCE.

#### YEOMANRY.

*Buckinghamshire (Royal Bucks Hussars).*—Surgeon-Captain Leonard A. Bidwell to be Surgeon-Major, dated September 20, 1909.

Edward Frederick Lawson to be Second Lieutenant, dated July 1, 1910.

#### ROYAL GARRISON ARTILLERY.

*Tynemouth.*—Surgeon-Major Hugh R. Bramwell, M.B., whose resignation was announced in the *London Gazette* of July 5, 1910, is granted permission to retain his rank, and to wear the prescribed uniform, dated September 14, 1910.

#### INFANTRY.

*4th (Denbighshire) Battalion, The Royal Welsh Fusiliers.*—Surgeon-Captain Richard Drinkwater resigns his commission, dated August 17, 1910.

#### ROYAL ARMY MEDICAL CORPS.

*North Midland Mounted Brigade Field Ambulance.*—Major Thomas Thompson to be Lieutenant-Colonel, dated April 1, 1910.

*2nd South Midland Mounted Brigade Field Ambulance.*—Captain Charles J. Deyns to be Major, dated February 23, 1910.

*3rd Welsh Field Ambulance.*—Quartermaster and Honorary Lieutenant Joseph C. Hignman to be Transport Officer, with the honorary rank of Lieutenant, dated June 10, 1910.

*5th Northern General Hospital.*—Captain Leonard F. Ellis, M.D., resigns his commission, dated August 17, 1910.

*2nd London Sanitary Company.*—Captain Walter F. Corfield resigns his commission, dated August 24, 1910.

*1st London (City of London) Field Ambulance.*—Eardley Lancelot Holland, M.D., F.R.C.S., to be Lieutenant, dated July 22, 1910.

*3rd East Anglian Field Ambulance.*—Alexander Graham, M.B., to be Lieutenant, dated July 7, 1910.

*3rd North Midland Field Ambulance.*—Martin Hallam to be Lieutenant, dated July 26, 1910.

*3rd Welsh Field Ambulance.*—William John Ackland to be Quartermaster, with the honorary rank of Lieutenant, dated June 10, 1910.

#### *Officers attached to Units other than Medical Units.*

Lieutenant Colonel Philip P. Whitcombe, M.B., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated August 17, 1910.

Lieutenant Howard Henry, M.D., to be Captain, dated July 21, 1910.

Captain James Wilson, M.B., to be Major, dated August 3, 1910.

Lieutenant Thomas H. Livingstone, M.D., F.R.C.S. (Edin.), to be Captain, dated June 20, 1910.

Major Charles J. Marsh resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated September 14, 1910.

Captain Philip J. Le Riche resigns his commission, dated September 14, 1910.

Lieutenant Arthur N. Haig, M.B., resigns his commission, dated September 14, 1910.

Hugh Selwyn Gaskell, M.B., to be Lieutenant, dated July 12, 1910.

Percival Thomas Rutherford to be Lieutenant, dated July 19, 1910.

Henry Edward Sutherland Richards, M.D., to be Lieutenant, dated June 15, 1910.

Charles Holt Caldicott, M.B., to be Lieutenant, dated July 22, 1910.

## TERRITORIAL FORCE RESERVE.

### ROYAL ARMY MEDICAL CORPS.

Captain Thomas Mahon Morton, from the List of Officers attached to Units other than Medical Units, to be Captain, with precedence as in the Territorial Force, dated September 8, 1910.

WAR OFFICE,  
September 2, 1910.

The King has been graciously pleased to confer the Territorial Decoration upon the undermentioned Officers of the Territorial Force who have been duly recommended for the same under the terms of the Royal Warrant, dated August 17, 1908.

### ROYAL ARMY MEDICAL CORPS.

Major Henry Christopher Lamport, M.B., attached to the 2nd West Lancashire Brigade, Royal Field Artillery.

Major William Alfred Dingle, M.D., attached to the 1st London Divisional Engineers, Royal Engineers.

Major John Ritchie, M.B., attached to the 8th (Argyllshire) Battalion (Princess Louise's) Argyll and Sutherland Highlanders.

## QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

*Postings and Transfers.* Matrons Miss A. B. Smith, R.R.C., to Colchester, from South Africa; Miss A. S. Bond, R.R.C., to Egypt, from Colchester. Sisters: Miss M. Smith, to Potchefstroom, South Africa, from Wynberg; Miss L. M. Moor, to Wynberg, from Potchefstroom; Miss E. M. Lyde, to Egypt, from Tidworth; Miss M. E. M. Grierson, to Egypt, from London. Staff Nurses: Miss J. Connell, to Connaught Hospital, Aldershot, from Netley; Miss M. L. Kaberry, to Cosham, from Egypt; M. B. Jackson, to Netley, on appointment; Miss D. C. Isaacson, to Tidworth, on appointment.

## ROYAL ARMY MEDICAL COLLEGE.

LIST OF CAPTAINS WHO HAVE BEEN INSTRUCTED TO JOIN THE NEXT SENIOR COURSE  
AT THE ROYAL ARMY MEDICAL COLLEGE ON OCTOBER 31, 1910

*Captains.*—F. J. Brakenridge, R. B. Black, J. H. Brunskill, A. J. Hull, P. Davidson, D.S.O., R. L. V. Foster, S. M. W. Meadows, D. S. Skeltou, J. G. Bell, A. E. L. Wood, J. C. G. Carmichael, R. H. Bridges, J. A. W. Webster, F. C. Lambert, J. B. Meldon, R. C. Wilmot, H. B. Kelly, E. M. Pennefather, B. H. V. Dunbar, D. G. Carmichael, J. M. M. Crawford, C. Bramhall, H. T. Stack, B. G. Patch, A. C. H. Gray, T. S. Dudding, R. H. MacNicol, H. H. J. Fawcett, S. L. Pallant, C. R. Sylvester-Bradley, S. E. Lewis, S. J. Hanafin, J. D. Richmond, E. M. Glanville, W. M. MacDowall, T. J. Wright, F. J. Turner, E. C. Whitehead, R. B. Hole, W. Wilev, H. Harding, M. F. Grant, M. D. Aheru, H. C. Winckworth, R. J. B. Buchanan, H. H. A. Emerson, A. M. Rose, P. Farrant, C. J. Wyatt, M. G. Dill

## EXAMINATIONS.

THE following questions are published for general information :—

### QUARTERMASTER-SERGEANTS.

Para. 285, b. 1.

- (1) Give the detail for lifting loaded stretchers.
- (2) Describe the formation of a dressing-station, its equipment, personnel, and functions. What points should be particularly looked to in choosing a site?
- (3) Describe in detail the encampment of "A" Section Field Ambulance with diagram, if possible.
- (4) Give a diagram showing the plan of pegs for a hospital marquee.
- (5) Describe fully a Mark I stretcher
- (6) "Squads in succession from the right—Load." How should No. 1 squad carry out this command?
- (7) State as briefly as possible the constitution of a Field Ambulance.
- (8) Show by means of a sketch plan, the position of men and section commanders when in company column marching to a flank in fours.

Para. 285, b. 2.

- (1) How are rations for the Royal Army Medical Corps of an independent section of a Field Ambulance obtained?

(2) (a) What is the order regarding the observation of secrecy to be observed by clerks? (b) What returns will the clerk to officer commanding a hospital be responsible for?

(3) The wounded having been brought into the tent division of a Field Ambulance camp, name the clerical and other duties that have to be performed.

(4) What are the duties of a sergeant-major in relation to soldiers in arrest?

(5) What is the power of a warrant officer with regard to violent mental patients?

(6) What is the procedure taken by the steward of a hospital in the event of the barrack accountant being unable to replace an equal number of clean articles for soiled?

(7) What are the duties of the senior warrant officer with regard to the diet sheets and accounts?

(8) What is the general responsibility of a chief cook in a military hospital with regard to the kitchen management?

Para. 285, b. 3.

(1) What is the procedure in the case of a greatcoat being lost through carelessness or neglect on the part of a soldier, and how is the article replaced?

(2) How are articles of equipment taken away by a deserter dealt with, and what are the instructions regarding the disposal of surplus arms and accoutrements in the possession of companies?

(3) What are the regulations regarding storage of clothing, for special reserves, for the mobilization of a medical unit?

(4) (a) How is personal clothing issued to a soldier already in receipt of the quarterly allowance; (b) when is the quarterly allowance withheld?

(5) What are the present regulations regarding the issue of foreign service helmets?

(6) (a) State what is done on the promotion of a sergeant to staff-sergeant, regarding the change of equipment, (b) give in detail the arms and equipment of a W.O., staff-sergeant, and rank and file.

(7) What is the number of " chests, shoemakers' tool, complete," allowed for a Field Ambulance and where obtained from?

(8) Suppose a man outgrows a garment before he becomes time expired, what steps should be taken to replace it?

Para. 285, b. 4.

(1) Describe how stores from home are unpacked abroad. What observations should be made, and how objections dealt with?

(2) Enumerate the army forms used when indenting and accounting for medical and surgical stores in a military hospital.

(3) Under what conditions are local purchases of medicines made?

(4) What is the procedure at the stocktaking of a general medical stores?

(5) What is the scale of medical and surgical equipment for a Cavalry Field Ambulance?

(6) What are the instructions as to the care of medical equipment held on charge for mobilisation purposes?

(7) How are losses of surgical stores dealt with?

(8) How are reserve supplies of medicines and materials dealt with in a military hospital?

#### STAFF-SERGEANTS.

Para. 284, b. 1.

(1) In the event of the transfer of a man on probation from a unit serving at home to the Royal Army Medical Corps, state the length of time the man should be on probation and the procedure to be adopted if the probation is (a) satisfactory (b) unsatisfactory.

(2) What documentary procedure is required for the discharge of a recruit under three months service considered medically unfit?

(3) How is the original attestation kept up to date?

(4) Explain the terms and conditions of. (a) extension of service; (b) re-engagement; (c) continuance in the Service beyond twenty-one years. What documents have to be made out in each case, and what is done with these documents when completed?

(5) A sergeant of the Royal Army Medical Corps of sixteen years' service is discharged as medically unfit. (a) What documents are made out for him? (b) What happens to his duplicate attestation, and what other documents should be attached to it? (c) What documents are made out and given to the man himself?

Para. 284, b. 2.

(1) What gratuity is given to: (a) A European soldier who has enlisted for more than three years with the colours on transfer to the reserve? (b) A soldier discharged medically unfit with twelve months' service?

(2) Under what circumstances (not due to misconduct) is corps pay liable to be forfeited?

(3) What charges may be paid from the consolidated stoppage account?

(4) How are the accounts (either credit or debit) of a deserter dealt with?

(5) What conditions are necessary for a man to be considered as an "efficient soldier," Class 1, for the purposes of issue of Service pay in the Royal Army Medical Corps?

#### SERGEANTS.

Para. 283, b. 1.

(1) Give the detail for dressing a squad with intervals.

(2) How will a company fall in for inspection, and describe the procedure?

(3) The diagonal march—give the detail for the command "right incline" given to a squad which is on the march in line.

(4) A company is moving forward in "company column;" it is desired to move to the right flank *in line*—give the words of command used

Para. 283, b. 2

(1) A stretcher squad having taken post at an ambulance wagon for the purpose of unloading, receives the order "unload wagons." How is this effected?

(2) Give the detail for the "advance" and "retire" with loaded stretchers.

(3) Describe in detail the duties of No. 4 bearers when working independently

(4) The squads are advancing with *closed stretchers* by the right—give the necessary words of command to move to the "right flank," to turn about, and to "lower stretchers."

Para. 283, b. 3

(1) What does "drunkenness on duty" include? If a man is drunk on the line of march, what does it include?

(2) How should a man absent without leave, as follows, be notified in regimental orders? (1) Absent one to twenty days; (2) absent for twenty-one consecutive days; (3) absent on the last day of the month.

(3) Name the different kinds of courts martial. Name the documents required to be prepared for district court martial.

(4) What is a soldier's position with regard to right to trial by court martial?

Para. 283, b. 4.

(1) State the procedure for assessing the amount of damages or losses against troops in barracks.

(2) What procedure will be adopted by guards on dismounting?

(3) How often should sentries be relieved and what arrangements should be made for their bodily welfare?

(4) What are the regulations when a stranger wishes to pass the guard at night and a countersign is in use?

Para. 283, b. 5.

(1) On the line of march a N.C.O. sees a man fall out, unable to march any further. What does he do?

(2) When a regiment or corps is leaving camp, after striking the camp what sanitary duties would be carried out, and how would you purify the ground found soiled?

(3) What is the latrine allowance for 100 men in camp? Give the size of the trench or trenches used.

(4) What are the steps you would take to keep a field kitchen free from flies?

Para. 283, b. 6.

(1) How will fuel and light and cleaning articles be requisitioned and accounted for?

(2) How is the washing of the underclothing of soldiers admitted to hospital arranged for? What record must be kept in connection with this service?

(3) In the event of a case of emergency occurring in a ward, what action will a ward master take?

(4) How does the hospital steward draw perishable and non-perishable articles of diet?

#### CORPORALS.

Para. 280, e. 1.

(1) What are the orders relating to soldiers acting as agents to private firms, &c.

(2) How will a soldier who is without head-dress act on an officer passing? How will a soldier salute when riding a bicycle?

(3) How would you instruct the recruits of your section as to the necessity for strict obedience?

Para. 280. e. 2.

(1) When may extra guards and picquets be ordered by a commanding officer as a punishment?

(2) If an escape of gas occurs in barracks, what action will be taken?

(3) State what action you would take in the case of a man in your barrack room becoming seriously ill during the night?

Para. 280. e. 3.

(1) What are the means of rendering doubtful water safe to drink?

(2) In pitching hell tents what points should be attended to?

(3) Give some of the precautions you would take every day if acting sanitary orderly in a camp.

Para. 280. e. 4.

(1) Under what circumstances would you summon the orderly medical officer?

(2) How is a person dealt with under the law of England (Lunacy Act, 1890) who, being an attendant on a lunatic patient, ill-treats or wilfully neglects such patient?

(3) What orders will be observed by the serjeant-major or senior N.C.O. of a detachment regarding kits of absentees?

Para. 280. e. 5.

(1) What care will be observed in adjusting the slings of a stretcher?

(2) How would you treat a case of gunshot wound of the abdomen on the field?

(3) How would you carry off the field a man suffering from a wounded foot?

Para. 280. e. 6.

(1) How do you judge an epileptic fit to be a true one and not a case of malingering? How would you treat a case of epilepsy?

(2) Describe in detail what you would do for a child brought to hospital suffering with "opistaxis."

(3) How would you give immediate treatment in a crowd to a case of fainting?

Para. 280 e. 7.

(1) What are the sources of impurity of air in a surgical ward?

(2) What means of exit for foul air exist besides "ventilators" in a ward at home? What is the usual position of ventilating outlets, and why are they so placed?

(3) How would you judge whether the ventilation of a room is being satisfactorily maintained?

Para. 280 e. 8.

(1) What appliances are used in the giving of chloroform, ether, and eucaine (hypodermically). Describe them and state how you would ensure their asepticity.

(2) What varieties of forceps do you know of? State what each is used for.

(3) Describe briefly the apparatus used for removing fluid from the chest.

## UNITED SERVICE MEDICAL SOCIETY.

THE first meeting of the 1910-11 Session of this Society will be held in the Royal Army Medical College, Grosvenor Road, on Wednesday, October 12, at 5.30 p.m., when papers will be read by Lieutenant-Colonel R. J. S. Simpson, C.M.G., and M. S. Pembrey, M.D., on "Soldier's Heart."

Membership of the Society is open to all medical officers of the Royal Navy, Army, Indian Medical Service, and Territorial Force. Subscription 5s. per annum. Meetings are held monthly, and a report of the transactions will be published after each meeting. The Secretaries invite contributions from members and others of short papers on naval or military medical subjects, and will be pleased to read papers for any members who are not able to be present at the meetings themselves. The Secretaries will be glad to hear of any local Service Medical Societies. It is proposed to invite these societies to become branches of the United Service Medical Society, the conditions being that the members subscribe to the United Service Medical Society. Abstracts, or, if necessary, full reports, of the proceedings of such branches will be published in the *Transactions*, copies of which will be distributed to all members.

For further particulars apply to the Honorary Secretaries, Fleet-Surgeon J. L. Smith, R.N., Admiralty, Whitehall, S.W., or Major W. S. Harrison, R.A.M.C., Royal Army Medical College, Grosvenor Road, S.W.

## FREEMASONRY.

THE "IN ARDUIS FIDELIS" LODGE, No 3432 E.C.

At an Emergency Meeting of the above Lodge held at Freemason's Hall, on Thursday, July 21, 1910, it was proposed by Bro Treasurer, and seconded by the W.M. and unanimously carried:—

"That the privileges of a Founder be allowed to all members of the Royal Army Medical Corps, Regular and Territorial, who would have been willing to sign the petition for the formation of the Lodge to the Grand Lodge of England, but who were prevented from doing so either by reason of the shortness of the time or through the fact that they were unaware of the petition for the formation of the 'In Arduis Fidelis' Lodge being presented, on payment of the Founder's fee over and above the Joining fee. All such members of the Corps must claim this privilege within six months of the passing and confirmation of this resolution. Failing which they can only join the Lodge as 'Joining Members'."

This Lodge meets in London on the first Thursday in every month, except the months of July, August, and September, at the Freemason's Hall, Great Queen's Street, Aldwych, W.C.

Founder's Fee	...	..	..	1	1	0
Joining Fee	...	..	...	1	1	0
Annual Subscription	...	..	...	1	1	0

For further particulars apply to the Secretary, Quartermaster-Sergeant C Rothschild, R.A.M.C.T., 51, Calthorpe Street, (Grays Inn Road, W.C.

## BIRTHS.

PARKER.—At Poona, on August 29, the wife of Major L. E. L. Parker, R.A.M.C., of a son (stillborn).

CAMERON.—On September 6, at Hillside, High Welwyn, Herts, the wife of the late Major K. M. Cameron, R.A.M.C., of a daughter.

CLARKE.—On September 18, 1910, at "Eversley," Salisbury, the wife of Major T. H. M. Clarke, C.M.G., D.S.O., R.A.M.C., of a daughter.

## DEATHS.

NICHOLAS.—On August 16, 1910, Major James Hamilton Nicholas, retired, late Royal Army Medical Corps, aged 54. He entered the Service as Surgeon, Army Medical Department, on July 31, 1880, became Surgeon-Major, Army Medical Staff, July 31, 1892, and retired on retired pay July 27, 1898.

CARROLL.—On August 27, 1910, at Potchefstroom, South Africa, Captain George Carroll, R.A.M.C., aged 35. He entered the Service on April 25, 1900, and was promoted Captain, April 25, 1903.

## EXCHANGES, &c.

*The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.*

Serjeant, R.A.M.C., in Egypt, wishes to exchange home. Three years to complete tour. Expenses arranged. Apply, "Fidelis," R.A.M.C., Military Hospital, Alexandria.

A free issue of twenty-five excerpts will be made to contributors of all articles classified under the heading of Original Communications, Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates:—

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	16	0 9 6	0 4 6				
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	16	0 16 9	0 6 9				
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## MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in March and September of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,  
 "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"  
 WAR OFFICE, WHITEHALL, S.W.

## Notices.

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### EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Lieutenant-Colonel W. A. Morris, Major F. Smith, Major W. S. Harrison, Captain H. A. Emerson, Colonel Sir D. Bruce, Major R. J. Blackham, Captain A. D. Jameson, Lieutenant-Colonel R. M. Bothuen, Captain Owen A. R. Berkeley-Hill, Colonel R. H. Forman, Captain S. C. Bowle, Colonel R. H. Firth.

The following publications have been received:—

*British:* *The Lancet*, *The Journal of Tropical Medicine and Hygiene*, *The Hospital, Army and Navy Gazette*, *The Australasian Medical Gazette*, *Medical Press and Circular*, *The Practitioner*, *The Royal Engineers' Journal*, *Journal of the Royal Sanitary Institute*, *St. Bartholomew's Hospital Journal*, *Guy's Hospital Gazette*, *Red Cross and Ambulance News*, *The Medical Review*, *Public Health*, *The Transvaal Medical Journal*, *The Journal of Tropical Veterinary Science*, *The Indian Medical Journal*, *Journal of the Royal Institute of Public Health*, *Journal of the Royal United Service Institution*, *The Indian Medical Gazette*.

*Foreign:* *Archives de Médecine Navale*, *Japanese Medical Journal*, *National Bulletin (U.S.A.)*, *Boletín de Sanidad Militar*, *Revista de Sanidad Militar*, *Archives de Médecine et de Pharmacie Militaires*, *Le Caducée*, *Norsk Tidsskrift for Militær-medicin*, *Archiv. für Schiffs-und-Tropen-Hygiene*, *Annali di Medicina Navale e Coloniale*, *Memorias do Instituto Oswaldo Cruz*, *Giornale di Medicina Militare*, *Bulletin de l'Institut Pasteur*. "The Histogenesis of the Blood Platelets," *Office International d'Hygiène Publique*, *Tidsskrift i Militær Hælsøvers*, *The Military Surgeon*, *American Medicine*.

# JOURNAL

OF THE

## ROYAL ARMY MEDICAL CORPS.

### Corps News.

NOVEMBER, 1910.

#### ROYAL ARMY MEDICAL CORPS.

Lieutenant Walter C. Rivers, half-pay list, resigns his Commission, dated August 27, 1910.

Major John James Carl Watson, C.I.E., M.D., retires on retired pay, dated October 8, 1910. Major Watson entered the Service on July 28, 1886, became Major Royal Army Medical Corps, July 28, 1898. His War Service is: China, 1900, Relief of Tientsin, Relief of Pekin. Despatches, London Gazette, November 6, 1900. Medal with clasp, C.I.E.

Lieutenant-Colonel John Battersby, M.B., is placed temporarily on the half-pay list on account of ill-health, dated October 2, 1910.

Captain Denis J. F. O'Donoghue retires, receiving a gratuity, dated October 12, 1910. Captain O'Donoghue entered the service on June 27, 1901, and was promoted Captain on June 27, 1904.

Quartermaster and Honorary Captain G. L. Allen retires on retired pay, dated October 15, 1910.

The King has been pleased to give and grant unto Captain Thomas Campbell MacKenzie, D.S.O., Royal Army Medical Corps, His Majesty's Royal license and authority to accept and wear The Imperial Ottoman Order of the Medjidieh, Fourth Class, which has been conferred upon him by His Highness the Khedive of Egypt, authorised by His Imperial Majesty the Sultan of Turkey, in recognition of valuable services rendered by him.

**HIGHER RATE OF PAY.**—Lieutenant-Colonel G. D. Hunter, D.S.O., has been selected for increased pay from September 3, 1910.

**ARRIVALS HOME FOR DUTY.**—From Bermuda: Colonel J. C. Culling. From Gibraltar: Majors H. V. Prynn and H. A. L. Howell. From Malta: Captains H. St. M. Carter, P. A. Lloyd Jones, and J. St. A. Maughan. Quartermaster and Honorary Captain A. J. Pilgrim. From Egypt: Captains R. C. Hallows and J. S. Pascoe.

**TRANSFERS TO THE HOME ESTABLISHMENT.**—Tour expired: Lieutenant Colonels W. G. Birrell, from Mauritius, and G. F. Gubbin, from India. Major H. A. Waring, from India; Captains G. A. D. Harvey, from Egypt, and H. E. Gotelee from Ceylon. By exchange, Captain J. H. Gurley from Egypt.

**POSTINGS.**—Colonel J. C. Culling to the Western Command; Lieutenant-Colonel W. G. Birrell, Captains G. A. D. Harvey and J. H. Gurley to the Eastern Command. Lieutenant-Colonel G. F. Gubbin, Captain T. C. Lauder, R. C. Hallows, P. A. Lloyd Jones, J. S. Pascoe, and H. E. Gotelee to the Irish Command; Major W. W. O. Beveridge, D.S.O. to the London District; Major A. H. Waring and Captain J. St. A. Maughan to the Southern Command; Captain J. M. Cuthbert to the Scottish Command; Captain H. St. M. Carter to the Aldershot Command.

**TRANSFERS BETWEEN COMMANDS AT HOME.**—Lieutenant-Colonel P. C. H. Gordon, from the Southern Command to the Western Command; Lieutenant-Colonel J. J. Russell, from the Irish Command to the Southern Command; Major G. A. T. Bray, from the Southern Command to the Eastern Command; Major G. B. Stanistreet, from the Southern Command to the London District; Major J. B. Anderson, from the London District to the Southern Command; Captain A. H. Hayes, from the Eastern Command to the Northern Command.

**APPOINTMENTS.**—Colonel R. Porter, Principal Medical Officer, Malta. Colonel J. C. Culling, Principal Medical Officer, Western Command. Lieutenant-Colonel W. G. Birrell, Charge of Royal Herbert Hospital, Woolwich (temporarily). Lieutenant-Colonel P. C. H. Gordon, Charge of Military Hospital, and Senior Medical Officer of the Coast Defences, Pembroke Dock. Lieutenant-Colonel J. J. Russell, Staff Officer to the Principal Medical Officer, Southern Command. Major J. B. Anderson, Embarkation Medical Officer, Southampton. Major H. A. L. Howell, Medical Officer to the Royal Army Clothing Factory. Captain A. H. Hayes, Sanitary Officer, Northern Command. Captain C. A. J. A. Balck, Specialist in Physical Training, Irish Command. Captain G. A. K. H. Reed, Specialist in Physical Training, Aldershot Command. Captain P. G. Easton, Medical Charge of Families, North Camp, Aldershot. Captain W. W. Browne, Specialist in Physical Training, Eastern Command.

**ARRIVALS HOME ON LEAVE.**—Major J. V. Forrest. Captains J. Powell, B. A. Craig, and H. G. Shierren. Lieutenant W. E. Marshall.

**ROSTER FOR SERVICE ABROAD.**—An exchange has been approved between Captains D. Ahern and J. H. Gurley.

**QUALIFICATIONS.**—Captain J. G. Bell has obtained the Diploma in Public Health of the University of Liverpool.

### EMBARKATIONS.

*For India.*—On September 21, 1910. Major F. R. Buswell, Captains F. Ashe, E. S. Bartlett. On October 5, 1910. Majors E. G. Browne, H. B. G. Walton; Captains H. F. Shea, E. G. French.

*For West Africa.*—On September 22, 1910. Captains T. F. Ritchie, N. E. J. Harding, C. R. Millar.

*For Mauritius.*—On October 14, 1910: Lieutenant-Colonel W. L. Reade; Captain V. J. Crawford; Lieutenant A. N. R. McNeill.

*For South Africa.*—On October 14, 1910. Major A. E. Thorp; Lieutenant B. A. Odhum.

**NOTES FROM ALDERSHOT.**—Sergeant-Major G. H. Roberts writes: "The nucleus of the 3rd Field Ambulance was supplied from this Command for duty with the recent Grand Army Manœuvres, most of the officers came from other Commands and were as follows:—

"*No. 3 Field Ambulance.*—Lieutenant-Colonel M. O'Halloran; Majors J. W. Jennings, D.S.O., and H. E. Winter; Captains A. R. O'Flaherty, W. C. Croly, R. R. Lewis, W. McConaghy, F. J. Brakenridge, and Lieutenant A. P. O'Connor; Captain and Quartermaster R. R. Cowan, Warrant Officer Sergeant-Major G. H. Roberts.

"*No. 5 Field Ambulance.*—Lieutenant-Colonel J. Donaldson; Major A. Pearse; Captains D. E. Curme, A. R. Greenwood, L. Cotterill, F. E. Rowan-Robinson, P. Farrant and H. R. Bridges, Lieutenant H. J. Joynt and Lieutenant and Quartermaster J. W. Osborne; Warrant Officer Sergeant-Major F. J. Taylor.

"*No. 6 Field Ambulance.*—Majors W. J. Mould, E. H. Condon, F. M. Mangin, and H. C. F. Stallard; Captains J. W. Langstaff, A. J. Hull, M. F. Grant, and R. M. Woodley; Lieutenant R. C. Priest and Lieutenant and Quartermaster A. Lunney; Warrant Officer Sergeant-Major W. H. Taylor.

"The weather for the whole period was glorious. Those who were able to see the programme through to the end were fortunate indeed, for they returned strong, healthy, bronzed, and benefited in every way. It was wonderful how men of the Royal Army Medical Corps (Special and Army Reservists also), who are not used to it, march their 17 to 20 miles a day with the irritating and frequent halts caused by breakdowns to vehicles, &c. At the end of the march they would set to work with a will and have a camp arranged in very quick time. The spectacular show of a Field Ambulance was

not indulged in; its rôle was to maintain its place in the force and be at hand if required.

"The Royal Army Medical Corps Inter-Company Football League commenced on 5th instant. The positions of the competing teams to date are as under:—

	Played	Won	Lost	Drawn	Goals for	Goals against	Points
No. 1 Company ..	1 ..	1 ..	— ..	..	7 ..	0 ..	2 ..
" 2 ..	1 ..	1 ..	— ..	..	7 ..	0 ..	2 ..
Depot "A" ..	1 ..	1 ..	— ..	..	3 ..	0 ..	2 ..
" "C" ..	2 ..	..	1 ..	1 ..	1 ..	3 ..	1 ..
" "B" ..	2 ..	..	1 ..	1 ..	1 ..	7 ..	1 ..
No. 3 Company ..	1 ..	..	1 ..	— ..	0 ..	7 ..	— ..

"The Corps Football Team has played the following games in connection with the Aldershot Command Senior Military League."

"Versus 2nd Battalion Cameron Highlanders, result 2—0 against. Our team certainly did not give a sparkling exhibition on this occasion; they were lacking in cohesion. The team has, of course, sustained a severe loss in losing players of the calibre of McKeer, Tipping, and Gregson, men whose places it will be difficult to fill; Private Ball, the right back, was a tower of strength in this game.

"Versus 2nd Battalion Coldstream Guards.—Result 2—1 in our favour. The team here played with a much better understanding and deserved to win by a much larger margin. Private McTuskey, inside right (who was absent from the initial game) seemed to have a steady effect on the forward line.

"The Draw for the Haywood Cup Competition took place on October 3, and resulted as follows. --

#### FIRST ROUND.

Match No. 1 ..	No. 1 Company	r.	No. 6 Company.
" 2 ..	" "B" ..	Bye	
" 3 ..	No. 2 ..	Bye	
" 4 ..	" "C" ..	r.	" 20 ..
" 5 ..	" "A" ..	v.	" 3 ..
" 6 ..	No. 11 ..	Bye	
" 7 ..	" 10 ..	Bye	
" 8 ..	" 12 ..	r.	" 35 ..

#### SECOND ROUND.

Match No. 1 ..	Winner of No. 3 Match	r.	Winner of No. 1 Match
" 2 ..	" 5 ..	r.	" 4 ..
" 3 ..	" 2 ..	r.	" 6 ..
" 4 ..	" 8 ..	r.	" 7 ..

#### SEMI-FINAL.

Match No. 1 ..	Winner of No. 4 Match	r.	Winner of No. 3 Match
" 2 ..	" 1 ..	r.	" 2 ..

#### FINAL.

Match No. 1 ..	Winner of No. 1 Match	r.	Winner of No. 2 Match
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"The first-named team has the choice of ground in each case. First round to be played on or before November 12, 1910. Second round to be played on or before November 30, 1910. Semi-final on or before December 17, 1910. Final to be played on a date to be notified later.

"Miss E. A. Cox, Matron Queen Alexandra's Imperial Military Nursing Service, doing duty here, has been warned for duty at Malta; her departure from the Connaught Hospital is much regretted by all who have worked with her.

"Lieutenant-Colonel H. M. Sloggett, R.A.M.C., officer in charge of Connaught Hospital, proceeds on one month's leave on 17th instant. Lieutenant-Colonel H. J. Rowan, R.A.M.C., will officiate during his absence until the 22nd instant, when Major A. L. Scott, R.A.M.C., will assume temporary charge.

"Lieutenant-Colonel H. J. Rowan, R.A.M.C., has been selected for attachment to the University of London County Officer's Training Corps from 22nd instant.

"Serjeant-Major W. H. Taylor, R.A.M.C., has proceeded on leave pending discharge to pension."

**NOTES FROM FERMOY.**—Presentation of the Royal Humane Society's Medal to Miss Lindsay, Q.A.I.M.N.S., by the Commander of the Forces at Fermoy, September, 1910.

In accordance with instructions issued by the General Officer commanding 6th Division, a parade was held at 9.30 a.m. in the New Barracks for the purpose of making the presentation before mentioned, but in consequence of the absence of the majority of the troops in camp at the time, only a party from each of the Battalions stationed there was available—viz., the 2nd Sherwood Foresters, and the 2nd Durham Light Infantry, together with the band of the former. Major-General W. P. Pulteney, C.B., D.S.O., General Officer commanding 6th Division and Brigadier-General F. C. Carter, C.B., commanding the 16th Infantry Brigade, were present. After the "General Salute" on the arrival of the Commander of the Forces, the troops were formed into a hollow square, when Brigadier-General E. S. May, C.B., C.M.G., read out the particulars of the act for which the medal was conferred. Stated briefly these were as follows. While bathing in the sea, near Kinsale, in the early part of the summer with some friends, one of the party who was unable to swim was swept into deep water by a wave, and was in immediate danger of being drowned. Miss Lindsay promptly went to her assistance, and succeeded in reaching her; both were carried out to sea by the current, which was very strong at the time, as the wind was off-shore. Miss Lindsay, however, remained with her friend, and kept her afloat until she herself lost consciousness. When rescued by a boat she was resuscitated with difficulty, but her friend unfortunately succumbed. In presenting the medal the Commander of the Forces said that he had often presented medals and decorations for acts of bravery, but that he had never done so with greater pleasure than on the present occasion; that it was in no one's power to do more for a friend than to risk one's life for her sake, and this Miss Lindsay had unhesitatingly done. In conclusion, he congratulated Miss Lindsay on receiving so prized a decoration. The parade was brought to a close by the troops forming up and marching past the Commander of the Forces, Miss Lindsay standing beside him.

**ROYAL ARMY TEMPERANCE ASSOCIATION, R.A.M.C. BRANCH.** Staff-Sergeant H. Williams writes. "The R.A.M.C. Branch of the Royal Army Temperance Association held a social evening and smoking concert on the evening of October 11, 1910, on the occasion of the departure of Sergeant J. W. Robinson (late Secretary of the Branch) and Sergeant W. Andrews to South Africa.

"About 200 members and friends were assembled in the Royal Army Temperance Association room at 7 p.m., with Captain G. G. Delap, D.S.O. (President of the Branch) in the chair. A very good programme had been arranged by the concert committee; a copy is shown below.

"The band commenced by rendering a selection from their varied repertoire of marches, which was much appreciated. Sergeant Dixon next obliged with a talented exposition of 'Thora,' for which he was deservedly encored. Private Barnes then gave a reading, which, if not amusing, was very edifying to the members present; this was followed by 'The Bog,' admirably sung by Lance-Corporal Molden, who for an encore obliged with 'Marguerite.' The next was undoubtedly 'the' turn of the evening, a comic song, 'Eh, by Gum!' by Private Lowe. A selection by the band was then followed by a song by Lance-Corporal Bull, who had to oblige again on being encored. After a parody on 'Mary of Argyle' by Private Stilling, there was an interval while those present did justice to the refreshments which had been thoughtfully provided by Staff-Sergeant Williams (Secretary).

"The second half of the programme was then continued; all those who contributed in the first half again obliged, with two or three fresh additions, notable amongst these being a piccolo solo by Lance-Corporal Borland, and a cornet solo by Private Felstead.

"At the conclusion of the programme Staff-Sergeant Williams in a speech referred to the way in which Sergeant Robinson had built up the Branch since taking over the Secretaryship about five years ago. He remarked that but for the untiring energy of Sergeant Robinson, backed up by his Committee (of whom Sergeant Andrews was one of the chief workers), the Branch would not have been what it now is, and the room, of which all the members are so justly proud, would not have existed.

"In responding, Sergeant Robinson said he could not have accomplished what he had but for the splendid support of his committee and the members collectively, and he hoped that his successor (Staff-Sergeant Williams), would be as well supported in continuing the good work of the branch in the Depot. He also hoped that on his return from South Africa he would see a much more commodious building than the one now in use, and the membership increased in consequence.

"After Sergeant Andrews had suitably responded, the evening's entertainment was brought to a close by singing 'Auld Lang Syne' and 'God save the King'.

## "PROGRAMME.

1. <i>Selection</i>	.. .. .	THE BAND.
2. <i>Song</i>	.. .. . 'Thora'	Serjt. DIXON.
3. <i>Reading</i>	.. .. .	Pte. BARNES.
4. <i>Song</i>	.. .. . 'The Bog'	Lance-Cpl. MOLDEN.
5. <i>Comic Song</i>	.. .. . 'Eh, by Gum!'	Pte. LOWE.
6. <i>Selection</i>	.. .. .	THE BAND.
7. <i>Song</i>	.. .. . 'Come down from that Big Fig Tree'	Lance-Cpl. BULL.
8. <i>Song</i>	.. .. . 'Mary of Argyle' (parody)	Pte. STILLING.

## 'Interval for Refreshments.

1. <i>Selection</i>	.. .. .	THE BAND.
2. <i>Song</i>	.. .. . 'Imitations'	Boy WORLD.
3. <i>Piccolo Solo</i>	.. .. . 'Deep Blue Sea'	Lance-Cpl. BORLAND.
4. <i>Song</i>	.. .. . 'The Blue Lagoon'	Lance-Cpl. MOLDEN.
5. <i>Song</i>	.. .. . 'The Old Brigade'	Pte. TAYLOR.
6. <i>Cornet Solo</i>	.. .. . 'Mary'	Pte. FELSTEAD.
7. <i>Song</i>	.. .. . 'Honey, come and listen to me'	Lance-Cpl. BULL.
8. <i>Song</i>	.. .. . 'Selected'	Serjt. DIXON.

'God save the King.'

**NOTES FROM CAIRO.** Lieutenant-Colonel W. J. Baker writes: "There will be many changes in No. 33 Company this trooping season. Major Beach and Lieutenants Saunders and Leeson arrived in the transport 'Soudan' on September 19. The first-named has been posted to Abbassia, and the latter two to the Citadel for duty. Captains Hallows and Pascoe returned to England in the 'Soudan.' Major O'Grady has relieved Major Jameson at Khartoum. Captain Ferguson has gone to Cyprus for duty. Captain Gibbon is about to transfer to the Egyptian Army, and Captain Gurley, who has been on sick leave all the summer, has effected an exchange to remain at home. Later on in the trooping season we shall lose Major Jameson and Captain Rahilly, tour expired. Captain Harvey proceeded on leave to England from Khartoum some two months ago, and being tour expired will not return to Egypt. His place at Khartoum will be taken by Lieutenant Fraser. Captain Ellery and Lieutenant O'Farrell are due back from leave about October 5, and Major Forrest on October 15. We shall then settle down to winter training and be prepared to work out schemes to baffle creation.

"During the summer months we lead a very strenuous life, work being then at a maximum and the numbers to do it at a minimum. No officers are allowed leave out of Egypt during the drill season, viz., from October 15 to April 1, which, unfortunately for the Royal Army Medical Corps, is just the time when one or more officers might most easily be spared, and it would ease the strain enormously in the hot weather. The summer is now rapidly drawing to a close and the cold season will soon be upon us. Whether it will be a successful season from a hotel manager's point of view will depend entirely upon whether or not we get a visitation of cholera on the return of the pilgrims from Mecca. The Egyptian sanitary authorities are taking most stringent precautions against its importation, so we must hope for the best. Take it all round, this summer has been by no means an unpleasant one. There were a few unduly hot days early in April, and the month of August was hotter than it should have been, but with those exceptions the summer has been cooler than is usually experienced, and very much cooler than last year. In consequence of this the admissions to hospital have been far below the numbers prevailing last year, and there have been exceptionally few cases of such diseases as enteric fever and dysentery. Throughout the whole of the summer the road to the Citadel has been in the throes of the new 'Cairo Drainage Scheme,' and driving up it has been fraught with much danger to life and limb.

"We fully expected, while the ground excavation for the drain-pipe was in progress, to be regaled with the accumulated odours of centuries of sewage-logged soil, but have been agreeably surprised in this respect.

"On the evening of September 19 a most enjoyable farewell smoking concert was given by the Serjeant-Major and non-commissioned officers and men of the company to Serjeant Philbrook and the other non-commissioned officers and men who were leaving for England in the 'Soudan' tour expired. The Royal Army Medical Corps Mess came across in a body later in the evening and joined in the festivity, Captain Essex contributing a song. Serjeant-Major Brennan in a felicitous speech wished the departing members of the company good luck and a pleasant voyage, which was responded to by Serjeant Philbrook. Very kindly references were made by both

speakers to their officers, whose health was then drunk with musical honours, the compliment being appropriately acknowledged by the Commanding Officer. The company loses quite a number of most excellent C.344 orderlies this trooping season, among whom may be mentioned Private Lee who took first place in the examination last year, and Lance-Corporal Stovold who passed out fourth this year.

"A stretcher drill and first aid competition was held on the afternoon of September 2, 9, and 16, in which six squads competed. Marks were allotted as follows: Time, 15; accuracy in drill, 25; accuracy in dressing, 60. Judging was done by the Orderly Medical Officer, the Serjeant-Major, and Serjeant Goodread. Each squad was given the same task. Different sets of wounds, &c., were given each day, items not being known beforehand. On the last day loaded stretchers had to be carried with a full glass of water on one of the poles and to be taken over a series of obstacles. The marking was done independently by the three judges and an average then struck for each squad representing the total marks gained on that particular day. On the last day each squad had to apply a rifle splint to a patient's right leg and fix a tourniquet over the left brachial artery and carry the patient on the stretcher to an appointed place over benches and tables. Only one glass of water came to grief in transit, the remainder arriving at their destination practically unspilled. The final results were as follows: First prize of 25s., taken from the 'Wilson Fund,' to No. 2 squad (No. 4 Lance-Corporal Stovold) with 234 marks out of a possible 300. This fund is what is left of a sum of £20 given by Captain Wilson, R.A.M.C., as a sort of thanksgiving offering for mercies received during the last Egyptian financial boom. It has been expended in small sums as an encouragement for good work at examinations, but has now, unfortunately, almost come to an end. We need another boom and more thanksgiving. Second prize of 15s., given by the Commanding Officer, to No. 1 squad (No. 4 Lance-Corporal Douglas) with 232 marks. Third prize of 10s, given by the Commanding Officer, to No. 6 squad (No. 4 Private H. H. Hund) with 231 marks.

"Nos. 4 and 5 squads made 228 and 224 marks respectively, a difference of only 10 marks between the first five squads. On the last day the Principal Medical Officer came up to view the competition.

"Among outstanding moves about to take place Quartermaster-Serjeant Banks and Serjeants Gorling and Moody are for Khartoum. Serjeant Payne for Cyprus and and Serjeant Knightly from Cyprus for Alexandria."

**NOTES FROM SIMLA.**—Lieutenant-Colonel R. S. F. Henderson, V.H.S., R.A.M.C., Secretary to the Principal Medical Officer, His Majesty's Forces in India, writes as follows, dated September 11, 1910.—

"*Appointments. Specialists.*—The following officers are appointed specialists in the subjects named with effect from the dates noted against them:

"*Dermatology.*—Captain F. V. Aylen, 1st (Peshawar) Division, from August 9, 1910.

"*Ophthalmology.*—Major S. A. Archer, 3rd (Lahore) Division, from August 16, 1910.

"*Electrical Science.*—Captain A. Chopping, (1st Peshawar) Division, from August 1, 1910.

"*Postings.*—The following changes are made in the list of postings of Royal Army Medical Corps Officers coming out for a fresh tour in India. Captain R. L. Popham, from 2nd (Rawalpindi) to 8th (Lucknow) Division. Captain S. M. Adye-Curran, from 8th (Lucknow) to 2nd (Rawalpindi) Division. Lieutenant J. Startin, from 9th (Secunderabad) to 6th (Poona) Division. Lieutenant W. G. Wright, from 6th (Poona) to 9th (Secunderabad) Division. Lieutenant A. M. Pollard, from 4th (Quetta) to 9th (Secunderabad) Division. Lieutenant G. G. Collett, from 9th (Secunderabad) to 4th (Quetta) Division.

### PROMOTIONS.

11812 Serjeant W. C. Banks, July 22, 1910, to be Staff-Serjeant; 18019 Lance-Corporal J. G. Julian, October 1, 1910, to be Corporal; 19121 Private T. Cook, August 22, 1910, to be Lance-Corporal (special under para. 281 S.O.).

### DISCHARGES.

5556 Quartermaster-Serjeant H. Barton, September 19, 1910, termination of second period; 7692 Quartermaster-Serjeant C. W. Beaumont, September 30, 1910, to pension; 7253 Staff-Serjeant J. Forman, September 20, 1910, to pension; 5951 Staff-Serjeant J. Ferraro, October 10, 1910, to pension; 10722 Corporal T. K. Turner, August 13, 1910, free after fifteen years' service; 8581 Corporal J. Reading, October 13, 1910, termination of second period; 8973 Private A. Walker, September 26, 1910, after eighteen years' service; 12030 Private C. Mower, September 23, 1910, termination of

first period; 12081 Private H. Gunton, October 12, 1910, termination of first period; 9757 Private C. Hayes, October 14, 1910, after eighteen years' service; 8782 Serjeant G. Bennett, October 10, 1910, termination of second period.

### TRANSFERS TO ARMY RESERVE.

13010 Private J. McConnell, September 9, 1910; 18134 Private S. C. Cox, September 12, 1910; 17925 Corporal R. Sheerin, September 8, 1910; 17938 Private W. Haddow, September 14, 1910; 17944 Private A. Flackney, September 15, 1910; 17947 Private W. Rodwell, September 16, 1910; 1255 Private W. Hutton, September 22, 1910; 1256 Private J. Dignam, September 22, 1910; 1258 Private J. Clinton, September 22, 1910; 17959 Private W. Leah, September 22, 1910; 1233 Private S. D. Hart, September 18, 1910; 1257 Private D. C. Fitzpatrick, September 22, 1910; 1260 Private J. F. Elliott, September 23, 1910; 17969 Private B. Newham, September 29, 1910; 1858 Private J. Hillen, September 29, 1910; 17976 Private J. O. Green, October 1, 1910; 18005 Private F. K. Churchill, October 8, 1910; 1291 Private P. E. Fogarty, October 1, 1910; 1278 Private J. Taplin, October 2, 1910; 17997 Lance-Corporal F. Morgan, October 8, 1910; 1310 Private A. F. Purdy, October 11, 1910; 18012 Private H. Strawbridge, October 14, 1910; 1303 Private J. P. Tighe, October 10, 1910.

### TRANSFERS FROM OTHER CORPS.

5117 Private A. T. Watts, September 19, 1910, from Army Service Corps.

### TRANSFERS TO OTHER CORPS.

8700 Serjeant F. C. Cudmore, September 5, 1910, to Territorial Forces; 4328 Private W. Cade, September 8, 1910, to Leicester Regiment; 154 Private N. Ehrenburg, September 1, 1910, to Wilts. Regiment; 4844 Private F. Garton, September 19, 1910, to R.F.A.; 741 Private J. H. O'Connor, September 26, 1910, to R. I. Fusiliers.

### DEATHS.

11570 Private A. J. Mayman, September 19, 1910.

### EMBARKATIONS FOR ABROAD.

To Sierra Leone, per ss. "Bathhurst," September 22, 1910: 14209 Corporal A. McCune, 17358 Corporal C. Ennor.

To Egypt, per H.T. "Plassy," October 4, 1910: 12382 Corporal J. W. Kay, 17735 Corporal W. Wilson, 17848 Corporal F. Reilly, 18083 Lance-Corporal J. Gleave, 1501 Private F. Thompson, 4301 Private T. Locke, 1782 Private C. R. Topp, 1539 Private A. J. Catlin, 4547 Private F. G. Lynn.

### DISSEMBARKATIONS FROM ABROAD.

From Mauritius per ss. "Galeka," September 23, 1910: 10005 Serjeant W. T. Hughes.

From Egypt, per H.T. "Soudan," October 3, 1910: 18453 Serjeant F. A. Philbrook, 19077 Private J. Bennett, 19673 Private F. C. W. Folwell, 18686 Private J. Rann, 10865 Corporal J. Cornwell, 11763 Corporal J. T. G. W. Green, 19598 Private P. Dawes, 19009 Private C. G. Drinkwater, 19272 Private W. J. Lee, 19536 Private E. Reece, 18868 Private F. Skelby, 1283 Private R. Simpson, 18710 Private A. Tebbutt, 18886 Private P. Walsh.

From Gibraltar, per H.T. "Soudan," October 3, 1910: 9074 Serjeant R. G. J. H. Palmer, 18196 Private J. J. White, 19387 Private C. W. Oldridge, 559, Private W. H. Larrington.

From Malta, per H.T. "Soudan," October 3, 1910: 18213 Corporal W. C. Pacey, 18094 Corporal W. Burns, 19035 Private J. H. Young, 19193 Private W. M. Stebbings, 1266 Private J. Whiterod.

From Malta, per ss. "Sardinia," October 10, 1910: 10339 Serjeant-Major F. O. Chappell.

### THE FOLLOWING N.C.O.'s AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

*For Staff-Serjeant.*—9552 Serjeant L. Mills, 18912 Serjeant H. Dawson, 15947 Serjeant T. Dennis.

*For Serjeant.*—12002 Corporal W. J. Knee, 17573 Corporal C. Harlen, 14209 Corporal A. McCune.

*For Corporal.*—19897 Private V. H. Freeman, 763 Private T. Desmond, 809 Private T. Rowland, 18380 Private E. Rodger, 19898 Private C. M. Ames, 1514 Private S. W. Harrod, 19387 Private C. W. Oldridge, 905 Private J. W. Hobbes, 368 Private R. Gorman, 925 Private C. Lomas, 1848 Private A. V. Martins, 13004 Private R. Leishman, 19067 Private T. Lewis, 19533 Private E. P. Newman, 935 Private H. M. Griffiths-Williams, 1051 Private W. H. Davey, 1094 Private H. B. Alloway.

15312 Serjeant G. Gillespie has been selected for duty as Medical Dispenser in the East Africa Protectorate.

Serjeant T. E. Oliver's appointment with the Medical Department of Northern Nigeria has been extended for a further tour.

### **SPECIAL RESERVE OF OFFICERS.**

#### **ROYAL ARMY MEDICAL CORPS.**

Clarence Edward Greeson, M.B., to be Lieutenant (on probation), dated August 17, 1910.

Sarsfield James Ambrose Hall Walshe to be Lieutenant (on probation), dated August 4, 1910.

Lieutenant Paul B. Roth, M.B., is confirmed in his rank.

Lieutenant George F. Randall is seconded for service under the Colonial Office, dated August 13, 1910.

### **TERRITORIAL FORCE.**

#### **INFANTRY.**

*5th (Prince of Wales) Battalion, The Devonshire Regiment.*—Surgeon-Lieutenant-Colonel and Honorary Surgeon-Colonel William H. Webb, M.D., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated October 8, 1910.

#### **ROYAL ARMY MEDICAL CORPS.**

The promotion of Major James Wilson, M.B., which was announced in the *London Gazette* of August 23, 1910, is ante-dated to July 10, 1910.

*1st East Lancashire Field Ambulance.*—Quartermaster and Honorary-Major William F. Dickinson resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated September 28, 1910.

Cadet Lance-Corporal John Walter Graham Steel, from the Oxford University Contingent, Senior Division, Officers Training Corps, to be Quartermaster, with the honorary rank of Lieutenant, dated September 28, 1910.

*3rd London (City of London) Field Ambulance.*—Captain Ernest B. Waggett, M.B., to be Major, dated February 3, 1910.

*1st South Midland Field Ambulance.*—Major Cyril H. Howkins to be Lieutenant-Colonel, dated August 22, 1910.

*3rd East Anglian Field Ambulance.*—Arthur William Beamand to be Quartermaster, with the honorary rank of Lieutenant, dated August 1, 1910.

#### *Officers attached to Units other than Medical Units.*

Lieutenant Samuel Maclean, M.B., to be Captain, dated May 19, 1910.

Lieutenant Charles Corfield, from the 3rd South Midland Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated August 17, 1910.

### **TERRITORIAL FORCE RESERVE.**

#### **INFANTRY.**

Surgeon-Lieutenant William Marley-Cass, from the 5th (Cumberland) Battalion, The Border Regiment, to be Surgeon-Lieutenant, with precedence as from July 26, 1905, dated October 5, 1910.

### **LOWLAND MOUNTED BRIGADE FIELD AMBULANCE.**

During last winter a series of special lectures for officers and N.C.O's. was arranged by Lieutenant-Colonel Halliday, commanding the Lowland Mounted Brigade Field Ambulance, Glasgow. All medical officers and N.C.O's. of medical units in Glasgow were invited to attend, and the series comprised five monthly lectures by officers of the regular Army, adjutants of territorial units, on "Transport and Supply during Peace and War"; "Organization and Administration of the Army"; "Appreciations and Orders"; "Intercommunication in the Field"; and "Maps and Map Reading." The success of the course has encouraged the instigator to repeat the course during the present winter, and a series of six lectures will be given on various topics of interest. The October lecture, by Captain Garwood, R.E., Adjutant of the Lowland

Divisional Engineers, dealt with "Camps," while among other lectures will be "The Inspection of Meat," which will be taken up by Mr. Alex. Trotter, M.R.C.V.S., the Veterinary Surgeon to the Corporation of Glasgow; "The Use of Cavalry in the Field," by Major Trotter, M.V.O., Brigade-Major; "Tactics for Medical Officers"; and "The Writing of Orders." The lectures take place in the headquarters of the Royal Army Medical Corps, Glasgow Units Territorial Force, on the first Tuesday of each month, and all medical officers are cordially invited.

### QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following ladies have received appointments as Staff Nurse: Miss M. L. Scott, Miss D. J. Macgregor, Miss M. Jackson, Miss E. Griffiths, Miss G. St. G. Horne, Miss C. W. Mann, Miss V. S. Newman, Miss E. F. Roberts, Miss I. M. Whyte, Miss R. C. S. Carleton, Miss E. M. Moore, Miss I. McM. Beaton, Miss I. J. Taunton.

*Postings and Transfers.*—Sisters: Miss M. L. Potter, to Cosham, from Hounslow; Miss M. M. Tunley, to Cosham, from Netley; Miss D. J. Saunder, to Woolwich, from Netley. Staff Nurses: Miss K. M. Matthews, to Curragh, from Cambridge Hospital, Aldershot; Miss K. Lowe, to Cork, from Dublin; Miss M. C. Tawney, to Chatham, from Cambridge Hospital, Aldershot; Miss M. L. Scott, to Colchester, on appointment; Miss D. J. Macgregor, to Cambridge Hospital, Aldershot, on appointment; Miss M. Jackson, to Dublin, on appointment; Miss E. Griffiths, to Colchester, on appointment; Miss G. St. G. Horne, to Cambridge Hospital, Aldershot, on appointment; Miss I. M. Whyte, to the Queen Alexandra's Military Hospital, London, on appointment; Miss W. Mann, to the Queen Alexandra's Military Hospital, London, on appointment; Miss V. S. Newman, to Woolwich, on appointment; Miss E. F. Roberts, to Woolwich, on appointment; Miss I. McM. Beaton, to Netley, on appointment.

*Arrivals.*—Miss E. A. Dowse, R.R.C., Matron, from Egypt; Miss G. M. Smith, Sister, from Egypt; Miss D. M. Taylor, Sister, from Egypt.

## ROYAL ARMY MEDICAL CORPS FUND.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON  
MONDAY, OCTOBER 17, 1910.

*Present.*

Surgeon-General W. L. Gubbins, C.B., M.V.O., Director-General, in the chair.

Colonel D. Wardrop, C.V.O.

Colonel A. Peterkin.

Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.

Major E. T. F. Birrell.

Major A. G. F. Stallard.

Major A. Bruce.

Captain G. G. Delap, D.S.O.

(1) The minutes of the last meeting were read and confirmed.

(2) It was noted that the following grants were received from companies for the General Relief Fund during the past quarter:—

Company						£	s.	d.
No. 6	..	..	Portsmouth	..	..	5	0	0
.. 8	..	..	York	..	..	5	1	9
.. 10	..	..	Chatham	..	..	3	0	0
.. 11	..	..	Dover	..	..	4	10	0
.. 12	..	..	Woolwich	..	..	2	10	0
.. 23	..	..	Pretoria	..	..	25	0	0
.. 25	..	..	Bermuda	..	..	5	2	0
.. 27	..	..	Hong Kong	..	..	2	0	0
.. ..	..	..	" Serjeants' Mess	..	..	2	0	0
.. 30	..	..	Malta	..	..	12	0	0
.. 32	..	..	Singapore	..	..	2	0	0
.. 33	..	..	Egypt	..	..	7	0	0
Detachment Middleburg	C.C.	..	..	..	..	50	0	0
Total						£125	3	9

# ROYAL ARMY MEDICAL CORPS BAND ACCOUNTS.

FOR QUARTER ENDING SEPTEMBER 30, 1910.

RECEIPTS.		EXPENDITURE.	
	£ s. d.		£ s. d.
Balance Credit brought forward .. ..	22 16 10	Bandmaster's Salary .. ..	30 0 0
Officers' (Aldershot) Subscriptions .. ..	18 0 0	Band Pay .. ..	48 6 3
Secretary R.A.M.C. Fund Quarterly Grant .. ..	73 0 0	Fares and Gratutities advanced .. ..	3 1 0
One Officer's Subscription .. ..	0 5 0	Postage .. ..	0 7 11
		Small Repairs .. ..	0 0 4
		Hawkes, Music and Repairs .. ..	11 11 11
		Boosey, .. ..	3 8 2
		Stationery .. ..	1 16 3
		Altering Tunics .. ..	3 17 10
		Balance Credit .. ..	16 12 3
	£114 1 10		£114 1 10

## ESTIMATE FOR QUARTER ENDING SEPTEMBER 30, 1910.

Receipts .. ..	£31 12 3	Expenditure .. ..	£102 19 0
Balance .. .	£71 6 9	Amount required .. .	£75 0 0

(3) The expenditure on General Relief for the quarter ending September 30, 1910, was confirmed, and a list of recipients is attached hereto.

(4) A special case for General Relief recommended by the Manchester City League of Help was considered, and it was resolved that no grant be made.

(5) The Aldershot Band Accounts were considered and passed, and are attached hereto. A grant of £75 was voted for the current quarter's expenses.

(6) An application was read from the Scottish Veteran Sailors, Soldiers, and Reservists Residence and Labour Workshops, Edinburgh, asking for a subscription from the Fund; it was proposed by Lieutenant-Colonel E. M. Wilson, seconded by Major A. Bruce, and carried that £5 be given for one year tentatively.

(7) It was noted that the solicitor's bill of £6 5s. for the recent change of Trustees to the General Relief Trust Fund has been paid.

(8) The grant of £5 12s. 6d. for a memorial wreath to the late Miss Florence Nightingale was approved.

(9) It was resolved that Major Pilcher be asked to serve on the Committee, vice Major Spencer, as a representative of the Royal Army Medical College.

(10) It was proposed by the Chairman and seconded by Colonel Wardrop and resolved that a special grant of £10 be given to the Soldiers and Sailors Help Association.

(11) It was resolved to postpone the question of a change of office until such time as the removal from St George's Barracks was definitely fixed.

(12) With reference to Para 8 of Minutes of Committee Meeting of July 18, Lieutenant-Colonel Harris at the request of the Committee agreed to continue in office until after the General Meeting of 1911.

#### ROYAL ARMY MEDICAL CORPS FUND.

##### RECIPIENTS FROM THE GENERAL RELIEF FUND FOR THE QUARTER ENDING SEPTEMBER 30, 1910.

Name	Age	District	Grant	Total	Remarks
Mrs. N. S.	69	London ..	£4	£56	Too old to get work.
Mrs. J. G.	43	Colchester	£4	£8	A delicate woman with four children to support.
Mrs. E. B.	43	Dover ..	£3	£3	Without money with four children. Husband in Canada.
Mrs. F. S.	38	Portsmouth	£4	£12	Five children to support.
Mrs. A. L.	50	Cork ..	£4	£28	Husband in asylum. Suffers from ill-health.
Mrs. D. E. G.	52	London ..	£4	£4	No visible means of support.
Mr. H. J. N.	48	.. ..	£3	£3	Destitute and out of work.
Mr. M. R.	77	Woolwich	£2	£8	Grant made to purchase a bath chair.
Mr. W. N.	47	.. ..	£4	£6	Suffers from paralysis; unable to work.
Mrs. M. A. H.	68	Colchester	£4	£4	Too old to work.
Mr. E. F.	59	Netley ..	£3	£3	Suffers from paralysis; unable to work.

## ARMY MEDICAL OFFICER'S BENEVOLENT SOCIETY.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON  
OCTOBER 17, 1910.

*Present:*

Surgeon-General W. L. Gubbins, C.B., M.V.O., D.G., in the Chair.

Colonel D. Wardrop, C.V.O.

Colonel A. Peterkin.

Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.

Major E. T. Birrell.

(1) The Minutes of the last Meeting were read and confirmed.

(2) It was noted that £128 9s. 6d. Consols at  $2\frac{1}{2}$  per cent. were bought at £81 7s. 8d. costing £105 3s. 9d., the proceeds of legacies.

(3) It was resolved to postpone the question of change of office until such time as the removal from St. George's Barracks was definitely fixed.

(4) With reference to Para 5 of the Minutes of the last Meeting, Lieutenant-Colonel Harris, at the request of the Committee, agreed to continue in office until after the next Annual General Meeting.

## UNITED SERVICES MEDICAL SOCIETY.

THE next meeting of the above-named Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Wednesday, November 9, 1910, at 5.30 p.m., when papers will be read by Major C. E. Pollock, R.A.M.C., on "Malingering," and Major S. L. Cummins, R.A.M.C., on "Guinea-worm in Egypt."

## FREEMASONRY.

THE "IN ARDUIS FIDELIS" LODGE, No 3432 E C

At an Emergency Meeting of the above Lodge, held at Freemasons' Hall on Thursday, July 21, 1910, it was proposed by Bro Treasurer, and seconded by the W M and unanimously carried:—

"That the privileges of a Founder be allowed to all members of the Royal Army Medical Corps, Regular and Territorial, who would have been willing to sign the petition for the formation of the Lodge to the Grand Lodge of England, but who were prevented from doing so either by reason of the shortness of the time or through the fact that they were unaware of the petition for the formation of the 'In Arduis Fidelis' Lodge being presented, on payment of the Founder's fee over and above the Joining fee. All such members of the Corps must claim this privilege within six months of the passing and confirmation of this resolution. Failing which they can only join the Lodge as 'Joining Members.'"

This Lodge meets in London on the first Thursday in every month, except the months of July, August, and September, at the Freemasons' Hall, Great Queen Street, Aldwych, W C

Founder's Fee	...	...	...	...	...	1	1	0
Joining Fee	...	...	...	...	...	1	1	0
Annual Subscription	...	...	...	...	...	1	1	0

For further particulars apply to the Secretary, Quartermaster-Sergeant C Rothschild, R A M C T, 51, Calthorpe Street, Gray's Inn Road, W C.

## BIRTH.

SCARLETT—On July 5, at "Boothsgreen," Springkell Avenue, Glasgow, to Captain and Mrs. W. W. Scarlett, a daughter.

## MARRIAGES.

McKENZIE—JOHNSTON.—On September 7, at St. Barnabas Church, Bexhill-on-Sea, by the Rev. E. Mortlock, Vicar of St. Barnabas, Captain J. McKenzie, R.A.M.C., eldest son of Mr. A. McKenzie, J P., Dunmail, Cults, Aberdeenshire, to Hilda Constance, fifth daughter of the late Mr. F. S Johnston, Civil Service, and Mrs. Johnston. Avenue Lemaire, Malo-les-Bains.

OTWAY—HICKMAN.—On October 5, 1910, at St. Michael's Church, Camberley, by the Rev. R. A. Storrs, Vicar, Captain A. Loftus Otway, R.A.M.C., to Bessie Norah (Betty), elder daughter of the late Major Devereux W. Hickman, 34th Sikh Pioneers, and Mrs. Hickman, Bessmount, Camberley, and granddaughter of Colonel W. Temple, V.C. (late R.A.M.C.).

## DEATHS.

MACPHERSON.--At Melcombe Regis, Dorset, on September 26, 1910, Brigade-Surgeon-Lieutenant-Colonel Robert Nasmyth Macpherson, retired pay, late Army Medical Staff, aged 72. He entered the Service as Staff Assistant Surgeon on March 31, 1866; served in the 104th Foot and Royal Artillery; became Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major, March 31, 1878; Surgeon-Lieutenant-Colonel, Medical Staff, March 31, 1886; Brigade-Surgeon-Lieutenant-Colonel, Army Medical Staff, on August 3, 1892, and retired on retired pay, April 9, 1893.

SKUES --At Streatham, Surrey, on August 31, 1910, Honorary Deputy-Surgeon-General Frederick McKenzie Skues, M.B., retired pay, late Army Medical Department, aged 77. He entered the Service on February 28, 1855, as Assistant Surgeon; served on the Staff and in the West India Regiment, 26th Foot, and Army Medical Department. He became Surgeon on October 14, 1868; Surgeon-Major, March 1, 1873. Brigade Surgeon, July 28, 1880; and retired on retired pay with the honorary rank of Deputy-Surgeon General on December 16, 1882.

SELBY --At Namu Tai on October 10, 1910, Major Robert Selby, M.B., Royal Army Medical Corps, aged 35. He entered the Service on July 27, 1898; was promoted Captain, July 27, 1901 and Major, April 27, 1910. His war service was: South African War, 1899-1902. Operations in Natal, 1899, including actions at Talana and Lombards Kop. Defence of Ladysmith. Operations in the Transvaal, east of Pretoria, October to November 29, 1900. Operations in the Transvaal, November 30, 1900, to May 31, 1902. Queen's medal with three clasps. King's medal with two clasps.

## EXCHANGES, &amp;c.

*The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.*

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	16	0 7 6	0 3 6				
25	4	0 3 0	0 1 3	4 0	1 3	3 6	0 9
	8	0 5 6	0 2 6				
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
	8	0 6 9	0 3 2				
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

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The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January, but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in March and September of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,

"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"

\* WAR OFFICE, WHITEHALL, S.W.

## Notices.

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### EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

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Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Colonel R. H. Firth, Major C. E. Pollock, Lieutenant Colonel B. Skinner, Major T. H. Goodwin, Lieutenant-Colonel G. F. Gubbin, Major F. J. W. Porter, Captain H. Stewart, Captain J. W. Lambelle, Captain J. H. Barbour.

The following publications have been received :—

*British: St. Bartholomew's Hospital Journal, Guy's Hospital Gazette, The Medical Review, Army and Navy Gazette, The Royal Sanitary Institute, The Royal Engineers' Journal, The Hospital, St. Thomas's Hospital Gazette, Medical Press and Circular, The Journal of Tropical Medicine and Hygiene, The Practitioner, Red Cross and Ambulance News, The Quarterly Journal of Medicine, Public Health, The British Journal of Tuberculosis, The Lancet, The Shield, The Cavalry Journal.*

*Foreign: Le Caducée, Revista de Sanidad Militar y La Medicina Militar Española, The Military Surgeon, Archiv. für Schiffs-und-Tropen-Hygiene, Bulletin of the Manila Medical Society, Annali di Medicina Navale e Coloniale, Archives de Médecine et de Pharmacie Militaires, Marine Hospital Service of the United States Hygienic Laboratory, Militærlægen, Office International d'Hygiène Publique, Le Mois Médical. Archives de Médecine Navale.*

# JOURNAL

OF THE

## ROYAL ARMY MEDICAL CORPS.

### Corps News.

DECEMBER, 1910.

#### ROYAL ARMY MEDICAL CORPS.

Major Charles C. Fleming, D.S.O., M.B., retires on retired pay, dated October 29, 1910. Major Fleming entered the Service on January 30, 1892; became Surgeon-Captain, Army Medical Staff, January 30, 1895; Major, Royal Army Medical Corps, January 30, 1904. His War Service is: Nile Expedition, 1898; Senior Medical Officer in operations on Upper Atbara, and in action of Gedaref; defence of Gedaref and subsequent operations in the neighbourhood; despatches, *London Gazette*, December 9, 1898. Medal, Egyptian medal with clasp, D.S.O. South African War, 1899-1902; advance on Kimberley, including actions at Belmont and Magersfontein; relief of Kimberley; operations in the Orange Free State, February to May, 1900; operations in Cape Colony south of Orange River, 1899-1900. Queen's medal with five clasps. King's medal with two clasps.

The undermentioned Captains to be Majors, dated October 28, 1910: John E. Hodgson, Matthew H. G. Fell; William B. Winkfield; Jonas W. Leake. John W. H. Houghton, M.B.; George M. Goldsmith, M.B.; Richard H. Lloyd; John M. Sloan, D.S.O., M.B.; Harry D. Packer; Lawrence Humphrey; Arthur O. B. Wroughton; Frank Ashe.

Lieutenant Wilfred W. Treves, M.B., from the seconded list, is restored to the Establishment, dated August 27, 1910.

Captain Robert B. Black, M.B., from the seconded list, is restored to the Establishment, dated November 1, 1910.

The undermentioned Lieutenants are confirmed in their rank: Frederick R. Laing, M.B.; John T. Simson, M.B.

Serjeant-Major Edward William Newland to be Quartermaster, with the honorary rank of Lieutenant, vice Honorary Captain G. L. Allen, retired, dated October 22, 1910.

**HIGHER RATE OF PAY.**—Lieutenant-Colonel H. N. Thompson, D.S.O., has been selected for increased pay from October 2, 1910.

**ARRIVALS HOME FOR DUTY.**—From India: On October 26, Lieutenant Colonels W. E. Berryman and G. Cree; Captains R. J. Cahill, E. J. H. Luxmoore and K. A. C. Doig. On November 9, Major F. J. C. Heffernan; Captains G. A. Kempthorne and S. C. Bowle. From Gibraltar. On October 19, Lieutenant-Colonel C. W. Johnson (by exchange with Lieutenant-Colonel S. G. Allen). From West Coast of Africa: On October 22, Captain G. R. Paignton. On October 24, Captain J. B. Clarke. On October 29, Captain H. W. Long.

**TRANSFERS TO THE HOME ESTABLISHMENT.**—Tour expired: Captain P. Dwyer, on October 31, from India.

**POSTINGS.**—Captain G. A. Kempthorne to the Scottish Command; Captain P. Dwyer, Lieutenants F. R. Laing and J. T. Stimson to the Aldershot Command; Lieutenant-Colonel G. Cree, Major H. V. Prynne, Captain E. J. H. Luxmoore to the Eastern Command; Lieutenant-Colonel C. W. Johnson, Captains S. C. Bowle and

K. A. C. Doig to the Southern Command; Captains W. M. B. Sparkes and R. J. Cahill to the Irish Command; Major F. J. C. Heffernan and Lieutenant H. T. Treves to the London District.

Quartermaster and Honorary Lieutenant E. W. Newland has been posted to the Southern Command for duty.

**TRANSFERS.**—Major A. O. B. Wroughton from the Eastern Command to the Southern Command; Captain T. S. Coates from the Irish Command to the Royal Arsenal, Woolwich; Major J. F. Burke (retired) from the Western Command to the Southern Command (temporarily).

**APPOINTMENTS.**—Lieutenant-Colonel G. Cree, Medical Inspector of Recruits, Eastern Command. Major G. A. Moore, charge of Military Families' Hospital, Chatham. Major H. V. Prynne, Medical Officer at the Royal Military Academy, Woolwich. Major F. J. C. Heffernan, Recruiting Medical Officer, London District. Major A. O. B. Wroughton, Specialist in Dermatology, Military Hospital, Hulsea. Captain A. M. MacLaughlin, Specialist Sanitary Officer, Scottish Command. Captain J. M. Cuthbert, Specialist in Pathology, Edinburgh. Captain W. M. B. Sparkes, Medical Charge of Staff and Departments, Dublin. Captain W. D. C. Kelly, Specialist in Operative Surgery, Dublin. Captain T. S. Coates, Medical Officer at the Royal Arsenal, Woolwich. Captain A. T. Frost, Specialist in Dermatology, Dublin.

The Medical Charge at Exeter has been converted into a full pay appointment.

**QUALIFICATIONS.** Captain H. E. Gotelee has obtained the Diploma in Public Health of the University of Cambridge.

**ARRIVALS HOME ON LEAVE.**—Captains F. A. McCammon and A. H. Jacob.

#### EMBARKATIONS.

*For India.*—On November 4, Majors S. J. C. P. Perry and G. E. F. Stammers; Captains J. W. West, S. M. Adye-Curran and J. H. Spencer.

*For Malta.*—On November 12, Colonel R. Porter.

*For Jamaica.*—On November 25, Major H. P. W. Barrow and Captain S. Field.

*For Gibraltar.*—On October 28, Captain A. W. A. Irwin.

*For Egypt.* On November 5, Captain D. Ahern; on October 29, Lieutenant T. B. Nicholls.

#### RESULTS OF EXAMINATIONS.

The following results of examinations are notified for general information.—

Passed for promotion to the rank of Captain in (b). H. W. Carson, M.B.; A. D. Stirling, M.B.; W. H. S. Burney; O. W. McSheehy, M.B.; E. C. Lambkin, M.B.

#### ROSTER FOR SERVICES ABROAD.

We have received the following communication from the Director-General, Army Medical Service:—

“The roster of R.A.M.C. officers for service abroad, which was last published in October, 1909, will appear in the January (1911) issue.

“The reason for the delay is that, owing to an establishment of Lieutenant-Colonels being likely to come into force in 1911, new regulations as regards exchanges, &c., will be necessary; these will be published at the same time as the roster.”

#### PROMOTIONS.

The following promotions, to complete Establishment, will take effect from the dates specified.—

*To be Sergeant-Major.*

No	Rank and Name	Date	Section	Remarks
10244	Qmr.-Serjt. Barnard, A. P.	5.8.10	..	Vice A. Fowler, to pension.
10047	.. .. Figg, C. A. ..	22.10.10	..	.. E. W. Newland, to H.M. Commission.

*To be Quartermaster-Serjeants.*

No.	Rank and Name	Date	Section	Remarks
10510	S.-Serjt. .. Eldergill, W. T.	22.7.10	..	Vice J. G. McLean, to pension.
11410	.. .. Conolly, W. P.	5.8.10	..	.. A. P. Barnard, promoted.
8269	.. .. Gibbs, G. A. ..	10.8.10	..	.. J. L. Driver, to pension.
9360	.. .. Horn, A. ..	12.8.10	..	.. H. L. Allwork, reduced
10431	.. .. Underwood, H	1.9.10	..	.. E. Hunt, to pension.
10665	.. .. Angell H. J. ..	20.9.10	..	.. H. Barton, to pension.
8947	.. .. Hicks, W. ..	1.10.10	..	.. C. W. Beaumont, to pension.

*To be Staff-Serjeants.*

10127	Serjeant .. Lishmund, F	5.7.10	..	Vice G. C. Young, to pension.
11049	.. .. Ulph, W. F. A. ..	15.7.10	..	.. J. O'Connor, to pension.
11214	S.-Serjt .. Squire, W. E. ..	18.7.10	..	From Egyptian Army. Vice G. O. Cowthard, to pension.
11224	Serjeant .. Rayer, A. T. ..	22.7.10	..	Vice F. Oliver, to pension.
11812	.. .. Banks, W. C. ..	22.7.10	..	.. W. T. Eldergill, promoted.
10751	.. .. Leeves, G. C. ..	27.7.10	..	Under para 351, King's Regulations. Supernumerary with Territorial Forces.
11029	.. .. Spowage, A.	3.8.10	..	Under para 351 King's Regulations. Supernumerary with Territorial Forces.
9703	S.-Serjt. .. Heponstall, W. B.	5.8.10	..	From Territorial Forces. Vice W. P. Conolly, promoted.
12146	Serjeant .. Wilson, W. J. ..	10.8.10	..	Vice G. A. Gibbs, promoted.
11417	.. .. Bush, A. ..	19.8.10	..	Under para 351, King's Regulations. Supernumerary with Territorial Forces.
11146	.. .. Wing, E. ..	21.8.10	..	Vice W. C. Banks, to Territorial Forces.
11250	.. .. Sage, J. ..	21.8.10	..	.. E. Wing. Supernumerary with Territorial Forces.
8532	.. .. Collins, H. G. ..	30.8.10	..	Under para 351, King's Regulations. Supernumerary with Territorial Forces.

*To be Staff-Serjeants—continued.*

No.	Rank and Name		Date	Section	Remarks
10166	Serjeant ..	Loft, E. R. ..	1.9.10	..	Vice W. B. Heponstall, to pension.
14851	„ ..	Willsher, C. B.	1.9.10	..	„ H. Underwood, promoted.
11403	„ ..	Wagstaffe, P. E.	5.9.10	..	Under para. 351, King's Regulations. Supernumerary with Territorial Forces.
14926	„ ..	Hunt, W. H. G.	5.9.10	..	Vice F. C. E. Godbolt, to pension.
12023	„ ..	Morris, S. C. ..	20.9.10	..	„ H. J. Angell, promoted.
12441	„ ..	Hubbard, L. ..	21.9.10	..	„ J. Forman, to pension.
10912	„ ..	McMahon, J. H.	1.10.10	..	„ W. Hicks, promoted.
9552	„ ..	Mills, L. ..	19.10.10	..	Special para. 351, King's Regulations.

*To be Serjeants.*

15048	Serjeant ..	Christie, G. D.	13.7.10	Nursing ..	From Colonial Government. Vice J. McLennon, to Colonial Government.
12965	Lce.-Serjt.	Tyler, H. E. ..	13.7.10	Clerical ..	Vice G. H. Wolfe, to Colonial Government.
18194	„ ..	Avery, W. F. .	15.7.10	Nursing ..	„ W. Wright, discharged.
8770	Corporal ..	Wilson, R. ..	15.7.10	General Duty	„ W. T. A. Ulph, promoted.
9121	Lce.-Serjt.	Barter, S. ..	22.7.10	„ ..	„ A. T. Rayer, promoted.
17736	Corporal ..	Keeble, J. D. ..	22.7.10	„ ..	„ W. C. Banks, promoted.
18977	„ ..	Pickup, C. M. ..	10.8.10	„ ..	„ W. J. Wilson, promoted.
13814	„ ..	Keuneally, P. ..	11.8.10	Nursing ..	„ H. W. G. Gregory, to Territorial Forces.
14538	„ ..	Wells, H. ..	17.8.10	General Duty	„ H. G. Miller, to Colonial Government.
17632	„ ..	Lunn, H. C. A. ..	21.8.10	Q.A.I.M.N.S.	„ G. S. Harrington, to pension.
17730	„ ..	Wills, P. ..	21.8.10	General Duty	„ J. Sage, promoted.
10336	Lce.-Serjt.	Howell, F. J. ..	30.8.10	„ ..	„ W. James, to pension.
18192	Corporal ..	Harlen, M. ..	31.8.10	Nursing ..	„ H. W. Whipp, deceased.
18890	„ ..	Moore, J. ..	1.9.10	General Duty	„ E. R. Loft, promoted.

*To be Serjeants—continued.*

No.	Rank and Name		Date	Section	Remarks
18969	Corporal	Gray, E.	1.9.10	Nursing	„ C. B. Willsher, promoted.
13032	„	Kerr, T.	5.9.10	General Duty	„ F. C. Cudmore, to Territorial Forces.
11513	„	Hinton, G.	5.9.10	„	„ W. H. G. Hunt, promoted.
12002	„	Knee, W. J.	20 9.10	Nursing	„ S. C. Morris, promoted.
17926	„	Winter, J. F.	2.9.10	General Duty	„ L. Hubbard, promoted.
17987	„	Betts, A.	1.10 10	Cooking	„ J. H. McMahon, promoted.

*To be Corporals.*

19596	Lee-Corpl	Butt, C. F.	„	Clerical	„
10751	„	Cooper, A. T.	„	General Duty	„
10892	„	Murray, W.	„	„	„
11153	„	Woods, S.	„	Nursing	„
12362	„	Porter, T.	„	Cooking	„
14172	„	Lavernmore, E. W.	„	Nursing	„
17501	„	Christie, J.	„	Clerical	„
17711	„	Robinson, A. R.	„	Q. A. I. M. N. S.	„
19933	„	Savegar, W. C.	„	Nursing	„
11864	„	Brooks, S. W.	„	„	„
11895	„	Higgins, J.	„	Cooking	„
994	„	Davies, G. A.	„	General Duty	„
16949	„	Inland, G.	„	Cooking	„
17001	„	Blair, D.	„	General Duty	„
17421	„	Plume, P.	„	Nursing	„
17517	„	White, F.	1 10 10	„	To complete Establishment.
17557	„	Starr, J. F.	„	Cooking	„
17628	„	Luscombe, T.	„	Clerical	„
17974	„	Moon, F. V.	„	Cooking	„
18029	„	Burt, A. L.	„	„	„
18045	„	Dixon, W. H.	„	Nursing	„
18049	„	Julvan, J. G.	„	General Duty	„
18083	„	Gleave, J.	„	Cooking	„
18083	„	Ryan, G.	„	General Duty	„
19895	„	Smith, W.	„	Nursing	„
18990	„	Wilson, A. C.	„	Cooking	„
19966	„	Chatten, G. V.	„	General Duty	„
18126	„	Walshe, T. P.	„	Clerical	„
18157	„	Pruden, A.	„	Nursing	„
18153	„	Beadle, E. E.	„	Clerical	„
18135	„	Mayo, W. C. H.	„	Nursing	„

**APPOINTMENTS.**

The following appointments, to complete Establishment, will take effect from the dates specified:—

*To be Lance-Serjeants (as Dispensers).*

No.	Rank and Name	Date	Section	Remarks
12382	Corporal .. Kay, J. H. ..	1.10.10	Cooking ..	To complete Establishment.
15238	" .. Wigglesworth, J. T. ..		General Duty	
18463	" .. Day, F. W. ..		Nursing ..	
12265	" .. Turpin, A. G. ..		" ..	

*To be Lance-Corporals.*

18906*	Private ..	Whyatt, T. G. ..	13 7.10	1st Class Clerk	To complete Establishment.
19563*	" ..	Harrington, H. ..	25 7.10	General Duty	
19121*	" ..	Cook, T. ..	22 8.10	1st Class Clerk	
10044	" ..	Hickman, C. W. ..	1.10.10	General Duty	
12627	" ..	Borland, H. ..		" ..	
12751	" ..	Carter, T. B. ..		Q.A.I.M.N.S.	
18004	" ..	Leishman, R. ..		Nursing ..	
13067	" ..	Lewis, T. ..		General Duty	
14397	" ..	Sadler, G. ..		Nursing ..	
16155	" ..	Clarke, G. ..		Superintendent ing Cook	
17820	" ..	Peckham, H. ..		General Duty	
16768	" ..	Barton, H. E. ..		" ..	
17699	" ..	Morrall, C. ..		Nursing ..	
17965	" ..	Thompson, I. J. J. ..		General Duty	
18061	" ..	Cairns, W. ..		Q.A.I.M.N.S.	
18254	" ..	Wright, A. W. ..		Nursing ..	
18380	" ..	Bodger, F. ..		1st Class Clerk	
18427	" ..	Barber, P. ..		Nursing ..	
18600	" ..	Grimsdall, A. ..		" ..	
18893	" ..	Hazell, J. ..		General Duty	
18627	" ..	Cockburn, B. ..		" ..	
18648	" ..	Haley, J. B. ..		Nursing ..	
18656	" ..	Maywood, H. G. ..		" ..	
18689	" ..	Appleton, C. ..		General Duty	
18743	" ..	Worrall, H. ..		" ..	
18724	" ..	Hill, W. ..		Nursing ..	
18725	" ..	Loweth, I. ..		General Duty	
18733	" ..	Mackenzie, A. ..		Nursing ..	
18739	" ..	Bradford, R. C. ..		General Duty	
18737	" ..	Stovold, W. T. ..		Nursing ..	
18759	" ..	Bogosoff, T. J. ..		" ..	
18741	" ..	Ferne, S. D. ..		" ..	
18763	" ..	Smith, F. J. ..		General Duty	
18805	" ..	Charlton, W. ..		" ..	
18808	" ..	Steels, W. ..		" ..	
18821	" ..	Weston, G. ..		Superintendent ing Cook	
105*	" ..	Newman, F. ..	24.10.10	Nursing ..	

\* Special under para. 281, Standing Orders, R.A.M.C.

**NURSING SECTION.**

The following appointments to the Nursing Section of the Corps will take effect from the dates specified :—

No.	Rank and Name		Date	No.	Rank and Name		Date
4623	Pte.	Richardson, F. A.	7.7.10	4404	Pte.	Page, A.	5.9.10
4391	"	Smith, G.	8.7.10	4847	"	Proctor, F.	5.9.10
453	"	Owen, T. R.	11.7.10	4697	"	Tucker, J. H.	5.9.10
4430	"	Adderly, J.	21.7.10	2054	"	Berry, G. H.	7.9.10
1519	"	Price, W. J.	22.7.10	4415	"	Pirret, N. M.	9.9.10
2030	"	Tucker, G. H.	6.8.10	4801	"	Jackson, H.	9.9.10
4636	"	Bird, R. C.	25.8.10	4835	"	Johnstone, D.	9.9.10
4807	"	French, C. E. R.	25.8.10	4326	"	Emslie, P. A.	12.9.10
4830	"	Harling, W. W.	25.8.10	4344	"	Sexton, H. W.	12.9.10
4809	"	Maplesden, R. B.	25.8.10	2148	"	Ashcroft, J.	14.9.10
2193	"	Williams, J.	25.8.10	4461	"	Gardner, H.	14.9.10
4787	"	Audus, H. A. L.	31.8.10	4505	"	Weighill, W. H.	14.9.10
4900	"	Washbourne, A. F.	31.8.10	4845	"	Wagstaff, R.	14.9.10
4374	"	Weilburn, J.	31.8.10	4507	"	Lagan, J.	21.9.10
17844	Serjt.	Cleushaw, W. A.	5.9.10	2236	"	Wilson, J. V.	21.9.10
17022	Corpl.	Weaver, A. R.	5.9.10	4567	"	Hochheimer, R.	21.9.10
4362	Pte.	Bruce, R.	5.9.10	1692	"	Dale, J. E.	21.9.10
4798	"	Connor, P.	5.9.10	4719	"	McGibbon, J.	21.9.10
4479	"	Darrell, D.	5.9.10	1818	"	Whitehead, J.	23.9.10
4529	"	Manly, J.	5.9.10	4547	"	Lynn, G. A.	26.9.10

**ARMY FORM C 344.**

The following is a list of successful candidates at the examination for Army Form C 344, Certificate of Training as a Nurse, held in May, 1910.

No.	Rank and Name		Station	Per-centage	Order of merit as regards number of marks awarded
1336	Private	Dovey, C.	Connaught Hospital	81	2
18337	Serjeant	Leaker, C.	Tidworth	89	3
19029	Corporal	Harvey, R. E.	Q.A.M. Hospital, London	87	4
18737	Private	Stovold, W. T.	Cairo	86	5
560	"	Norris, P. J.	Gibraltar	85	6
12815	Serjeant	Burgess, G.	Connaught Hospital	85	7
19744	Private	Simmons, R. W.	Gibraltar	84	8
19320	Corporal	Ritchie, H. A.	Tidworth	84	9
1556	Private	Calvert, N. B.	Connaught Hospital	83	10
1785	"	Phillips, W. J.	Cambridge Hospital	83	11
11797	Corporal	Cooke, J. E.	Netley	82	12
19192	L.-Corpl.	Poole, F.	Cambridge Hospital	82	13
1848	Private	Martins, A. V.	Gibraltar	81	14
19821	"	Young, B. L.	"	81	14
19030	"	Mann, R. S.	Connaught Hospital	81	15
968	"	Fairweather, R. E.	Gibraltar	81	15
1175	"	Bamford, W. J.	Devonport	80	16
1098	"	Wright, G. M.	Cairo	80	16
19427	"	Vidler, C. E.	Alexandria	80	16
15670	Serjeant	Goodread, F. W.	Cairo	79	17
19598	Private	Dawes, P.	"	79	18
19933	L.-Corpl.	Savegar, W. C.	South Africa	79	18
237	Private	Flavell, J. E.	Malta	78	19

*Army Form C 344.—Continued.*

No.	Rank and Name		Station	Per-centage	Order of merit as regards number of marks awarded
19814	Private	Croker, A. G.	Woolwich	78	20
118	"	Rogers, A. C.	South Africa	78	21
18425	"	Atkinson, F. W.	Malta	77	22
19023	"	Tarbet, A.	Alexandria	77	23
305	"	Hobbes, J. W.	Gibraltar		
94	"	Price, D. W.	"		
223	"	Peake, W.	South Africa		
11896	Serjeant	Spackman, A. P.	York	75	24
17699	Private	Morrill, C.	South Africa	75	25
19747	"	Hyde, C. H.	Malta		
19698	"	Wass, M.	Dublin		
16165	Serjeant	Bullough, P.	York		
17513	Corporal	Gallivan, J.	Connaught Hospital	75	26
19085	Private	Vinton, C. J.	Carro	74	27
15196	Corporal	Pepper, C. T.	Q A M Hospital, London	73	28
19312	Private	Turner, W.	Cosham	73	29
1598	"	Bryant, E. C.	Netley	73	30
19236	"	Pettit, E. F.	Dublin	72	31
368	"	Gorman, R.	Gibraltar		
19721	"	Walsh, C. F.	Woolwich		
19745	"	Young, H. S.	Dublin		
196	"	Kent, A. J.	Carro	72	32
264	"	Trout, A.	Alexandria		
19461	"	Chamberlain, C.	Woolwich		
1600	"	Godden, F. T. H.	Woolwich		
1360	"	Doyle, J.	Curragh	71	33
1617	"	Eaton, C.	Woolwich	71	34
1808	"	McClay, W. J.	Cambridge Hospital	71	35
19709	"	Young, W. E.	Malta	70	36
18428	"	Bourne, F. J. J.	Cambridge Hospital	70	37
19864	"	Pitt, T. R.	Devonport	69	38
1141	"	Dyson, H. A.	Netley		
19822	"	Mundy, A.	Malta		
19110	"	Smith, C. H.	South Africa		
19802	"	Leaky, A.	South Africa	69	39
18518	"	Darlington, J. W.	Shorncliffe		
1716	"	Duncombe, F. G. H.	Q A M. Hospital, London	68	40
19259	"	Burrows, A. W.	York	67	41
18864	"	Thorburn, J.	Curragh		
18544	"	Branchette, E. T.	Q A M. Hospital, London		
19132	"	Parker, W. T.	Malta		
1504	"	Kirby, A. F. P.	Curragh	66	42
418	"	Horsfall, B.	South Africa	66	43
18118	"	Smith, G.	"		
1439	"	Ramsay, W. D.	Dublin	65	44
18948	Corporal	Moore, E.	Carro	65	45
18284	Private	Martin, F.	Cosham	65	46
19429	"	Orton, R.	York	64	47
19958	"	Hamilton, F. W.	South Africa	63	48
284	"	Gregory, A. O.	"	62	49
189	"	Taylor, G. A.	"	60	50
19777	"	Harland, P.	"		
19547	"	Mansell, W. A.	Edinburgh		
14770	Serjeant	Buckner, A.	Woolwich		
19858	Private	Quickenden, G. J.	Gibraltar	*	

\* Examined in one subject only in which they failed in last year's examination.

**ADVANCEMENT OF PRIVATES (CORPS PAY).**

The following advancements in rate of Corps Pay will take effect from October 1, 1910 —

*To be Advanced to the Third Rate (at 8d.).*

*As Orderlies.*

No.	Name	No.	Name	No.	Name
12624	Farrell, P.	19916	Carroll, H. J.	1190	Handasyde, S.
16051	McFarlane, W.	19990	Horne, A.	1344	Shelley, W. C.
18251	Ovenden, E. E.	42	Harding, D. G.	1363	Earle, B. L.
18610	Hassard, H. W.	70	Hanford, J.	1425	Evamy, W.
18995	Hayes, E.	120	Hodges, F. B. A.	1339	Ramsay, W. D.
19098	Burley, F. P.	237	Flavell, J. E.	1440	Johnston, G.
19236	Pettit, E. F.	284	Gregory, J. O.	1475	Bamford, W. J.
19251	Murphy, P. J.	501	Benson, O.	1498	Miller, E.
19336	Barnes, A.	530	Adams, A.	1598	Bryant, E. C.
19444	Jones, H. A.	866	Shun, W.	1661	Fielding, H. E.
19698	Wiss, M.	890	North, J. P.	1750	Barron, P.
19711	Horslead, S. L.	968	Fairweather, R. E.	1751	Plaun, F. H.
19744	Simmons, R. W.	977	Holl, W.	1841	Fielding, S. E.
19821	Young, B. L.	1094	Alloway, H. B.	1818	Martins, A. V.
19827	Baxter, J. W.	1102	Hake, J. G.	1913	Johns, W. C.
19888	Pilgrim, A. T.	1141	Dyson, H. A.	1975	Hawkes, W.

*As Clerks.*

19282	Golden, H.	19913	Roberts, T. S.	521	Triebwasser, G. O.
19385	Johnson, H.	11	Andre, J.	1862	Doyle, G. A.

*To be Advanced to the Fourth Rate (at 6d.).*

*As Orderlies.*

No.	Name	No.	Name	No.	Name
18854	Forge, C. D.	1667	Turner, C. W.	2120	Smith, A. Q.
19128	Burr, W. G.	1710	Hudson, J. R.	2126	Hardy, R. H.
19220	Ward, H.	1869	Brason, R.	2167	Stirk, A. J.
19775	Cheese, C.	1879	Harris, T.	2174	Hill, R.
226	Wilks, A. H.	1920	Ford, E. E.	2187	Thomas, H.
963	White, J.	1925	Marchant, W.	2252	Scott, J. S.
1092	King, E. B.	1939	Sawers, W.	2255	Pool, L. F.
1463	Durrant, W. E.	1945	Chapman, A.	2279	Macmillan, T.
1467	Donovan, P.	1998	Patrick, E.	1317	Cummins, J.
1514	Harrod, S. W.	2027	Coney, E. H.	4353	Newman, G.
1519	Price, W. J.	2064	Walsh, W.		
1663	Furness, H. E.	2080	Foot, W. R.		

*As Clerks.*

19064	Marshall, W. E.	1335	Carlile, A. H.	2205	Lewis, A. R.
1925	Lomas, C.	1890	Woods, H.	4310	Tomlyn, F. H.
1097	Herbert, R.	2147	Hampson, W. C.		

*As Cooks.*

18910	Foggon, R. J.	1605	Firth, G.	2003	Fullbrook, E. R.
19295	Fernando, H.	1974	Ferguson, C. D.	2128	Greenwood, W. R.
19456	Flanagan, W. J.				

**SANITARY ORDERLIES (CORPS PAY).**

The following Privates are advanced to the Fourth Rate of Corps Pay at Gd., as Sanitary Orderlies, from the dates specified:—

No.	Name	Date	No.	Name	Date
210	Pearce, R. .. ..	23.5.10	19889	Kirk, A. .. ..	27.8.10
246	Burns, H. .. ..	1.7.10	1535	Erskine, J. .. ..	28.8.10
1652	Hare, S. .. ..	1.7.10	18735	Forge, W. F. V. ..	29.8.10
4568	Wilson, J. K. .. ..	5.7.10	1031	Moon, H. .. ..	1.9.10
1853	Trowler, H. J. .. ..	5.7.10	4548	Pritchett, F. .. ..	1.9.10
1774	Ashton A. M. .. ..	6.7.10	1709	Steedman, F. A. ..	1.9.10
750	Woodward, W. A. ..	9.7.10	19496	Petit, H. .. ..	11.9.10
2033	Corcoran, D. .. ..	13.7.10	19650	Gawn, H. .. ..	17.9.10
2138	O'Brien, M. .. ..	8.8.10	19671	Savage, W. R. .. ..	22.9.10
678	Reed, L. .. ..	15.8.10			

**AMENDMENT--CORPS ORDER.**

With reference to Corps Order dated July 1, 1910, in the column for "Section" opposite the name of No. 12038 Lance-Sergeant Garlick, I. H., for "General Duty" read "Clerical."

**AWARD OF ARMY FORM C 344.**

The undermentioned has been awarded A.F. C 344, on completion of 3 years' training, in accordance with sub-para. VI. of para. 22, Appendix 2, I, A, S.O., R.A.M.C., on the date specified:—

No. 14797 Corporal Cooke, J. E.—14.9.1910.

**DISCHARGES.**

8609	Qmr.-Serjt.	Cookson, G. .. ..	5.11.10	Termination of second period.
9404	S.-Serjt. ..	Lovett, A. .. ..	25.10.10	
9802	"	Gurnsey, C. G. .. ..	31.10.10	At own request after 18 years.
1870	Private	Nelson, A. V. .. ..	22.10.10	Medically unfit
18563	"	Avery, G. .. ..	19.10.10	Termination of first period
8862	"	Taylor, G. J. .. ..	21.10.10	At own request after 18 years.
559	"	Larrington, W. H. J. ..	28.10.10	Medically unfit.
15684	"	Foster, A. .. ..	25.10.10	Free under para. 1058 (n) R.W.
12121	"	Mean, G. W. H. .. ..	30.10.10	Termination of first period
152	"	Taylor, W. H. .. ..	15.10.10	On payment of £18
2271	"	Fox, C. D. .. ..	5.11.10	"
10337	"	Douglas, W. G. A. ..	4.11.10	At own request after 18 years.

**TRANSFERS TO ARMY RESERVE.**

18001	Pte.	Cook, A. .. ..	13.10.10	1326	Pte.	Oyston, W. J. A. ..	17.10.10.
18002	"	Beard, W. .. ..	15.10.10	18036	"	Scanton, P. .. ..	19.10.10.
18019	Crpl.	Julyan, J. G. .. ..	19.10.10	18030	"	Palmer, H. .. ..	21.10.10.
19505	Pte.	Baugh, F. H. .. ..	19.10.10	18028	"	Nicholls, A. .. ..	23.10.10.
18021	"	Carleton, J. .. ..	20.10.10	18079	"	Harrison, F. .. ..	31.10.10.
1307	"	Johnston, S. .. ..	19.9.10	18056	"	Yates, E. .. ..	2.11.10.
18014	"	Yate, B. J. .. ..	15.10.10				

**TRANSFERS FROM OTHER CORPS.**

5164	Private ..	Dowding, A. J. ..	1.10.10	From Rifle Brigade.
5165	" ..	Cullinford, J. H. ..	6.10.10	" Wilts Regiment.
5166	" ..	Blair, J. ..	6.10.10	" A. & S. Highlanders
5167	" ..	Squires, H. ..	12.10.10	" Royal Fusiliers.
5179	" ..	Clark, T. ..	3.10.10	" Suffolk Regiment.
10721	S.-Serjt. ..	Smith, A. ..	2.11.10	" 1st Anglian Field Amb

**TRANSFERS TO OTHER CORPS.**

8903	S.-Serjt. ..	Robson, J. ..	11.10.10	To Territorial Forces.
11788	Serjeant ..	McDonald, D. ..	11.10.10	" S of I. Territorial Forces
10005	" ..	Hughes, W. T. ..	27.10.10	" " " " " "
10518	" ..	Brice, E. G. J. ..	3.11.10	" Territorial Forces.
15312	" ..	Gillespie, G. ..	4.11.10	" E. African Protectorate
1593	Private ..	McGill, G. ..	10.10.10	" R. Scots Greys.
18726	" ..	Prosser, W. ..	17.10.10	" Army Ordnance Corps
4683	" ..	Hanlon, F. W. ..	18. 9.10	" Royal Dublin Fusiliers
4370	" ..	Harrison, T. ..	5.11.10	" 7th Hussars.

**EMBARKATIONS FOR ABROAD.**

To MAURITIUS, PER H.T. "SOUDAN," OCTOBER 13, 1910.

7782	S.-Major ..	McCoiglin, T. E. ..	1669	Private ..	Trary, R. ..
11024	Lieut.-Serjt.	Catherall, W. ..	1738	" ..	Worster, W. E. ..
1831	Corporal ..	Riley, S. T. ..	2134	" ..	Blacker, S. J. ..
17794	" ..	Beckett, W. A. ..	19055	" ..	Rood, W. R. ..
4393	Private ..	Hargrave, T. B. ..	1438	" ..	Ridhalgh, G. L. ..
19001	" ..	Barrett, J. ..	1974	" ..	Ferguson, C. D. ..
17820	" ..	Peckham, H. ..			

To SOUTH AFRICA, PER H.T. "SOUDAN," OCTOBER 13, 1910.

11039	S.-Serjt. ..	Richardson, F. ..	18386	Private ..	Adye, J. ..
14050	Serjeant ..	Andrews, W. ..	1190	" ..	Handasyde, S. W. ..
16216	" ..	Robinson, J. W. ..	1367	" ..	Hollowell, W. T. ..
18385	" ..	Coupland, T. W. ..	1363	" ..	Green, C. D. ..
17926	" ..	Winter, J. T. ..	1383	" ..	Rouse, K. ..
18185	Lieut.-Corpl.	Mayo, W. C. H. ..	2259	" ..	Wilson, R. H. ..
18530	" ..	Murphy, H. ..	1412	" ..	Palmer, W. J. ..
18561	Private ..	Flackfield, E. J. ..	18854	" ..	Forge, G. J. ..
17761	" ..	Dunkley, W. A. ..	4428	" ..	Barker, R. ..
1498	" ..	Miller, E. ..	1398	" ..	Cheney, R. H. ..
1587	" ..	Curnoe, W. G. ..	1519	" ..	Price, W. J. ..
1413	" ..	Jackson, W. E. ..	19883	" ..	Hamilton, C. J. ..
1829	" ..	Lovell, S. ..	1342	" ..	Davis, H. ..
1189	" ..	Ivors, R. ..	2170	" ..	Tromans, W. B. ..
1715	" ..	Rodgers, H. ..			

To MALTA, PER H.T. "REWA," NOVEMBER 3, 1910.

17450	Corporal ..	Elsey, W. J. ..	17898	Private ..	Knagg, W.
18383	Lieut.-Corpl.	Hutchings, W. ..	1447	" ..	Conway, P.
1427	Private ..	Kent, W. ..	2083	" ..	Pearce, W. E.
18109	" ..	Bridge, F. R. ..	19140	" ..	Price, J.

**DISEMBARKATIONS FROM ABROAD.**

FROM SIERRA LEONE.

11327	Serjt.	Quinlan, M. K	21.10 10	14761	Crpl.	Robertson, W.	29.10.10
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**THE FOLLOWING N.C.O.'S AND MEN HAVE QUALIFIED FOR PROMOTION  
IN THE VARIOUS CORPS EXAMINATIONS.**

## FOR SERJANT.

14686	Corporal ..	Wilson, W. A. ..	17542	Corporal ..	Colgan, R.
19924	" ..	Barr, E. D. ..	9878	Lieut.-Serjt.	Robinson, J.
17257	" ..	Bartlett, J. J. ..			

## FOR CORPORAL.

226	Private ..	Wilks, A. A. ..	1734	Private ..	Dixon, W.
570	" ..	Crooke, G. B. ..	1753	" ..	Artken, A.
827	" ..	Stammers, A. ..	2278	" ..	Gilbee, J.
997	" ..	Corbett, T. F. ..	18444	" ..	Hall, A. H.
2214	" ..	Manning, J. M. ..	19781	" ..	Davey, H. J.
18409	" ..	Horsfield, P. M. ..	19460	" ..	Payne, C. J. T.
19301	" ..	Richardson, H. ..	11836	" ..	Pitt, C.
19601	" ..	Pollock, R. ..	19202	" ..	Barden, F. J. R.
1190	" ..	Handa-vide, S. ..	19864	" ..	Pitt, T. R.
1620	" ..	Pegg, A. E. ..			

## QUALIFIED DISPENSERS.

16247	Corporal ..	Freeman, E. S. ..	17496	Private	Browne, C.
11614	" ..	Howard, W. H. ..	17022	Corporal ..	Weaver, A. R.
18395	Lieut.-Corpl.	Speller, C. A. J. ..	105	Private	Newman, F.
12187	Corporal ..	Brookes, J. A. ..	11741	Corporal ..	Hudson, H.
16678	" ..	March, J. E. ..	19259	Private ..	Burrows, A. W.
18226	Lieut.-Corpl.	Bilbee, L. V. ..	18032	Corporal ..	Burns, J. J.
19851	Private ..	Claydon, P. E. ..	16917	" ..	Fish, A.
1856	" ..	Leaney, A. F. ..			

**DEATH.**

15009	Private ..	Williams, W. ..	20 10.10	at Tidworth.
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**NOTES FROM ALDERSHOT.**—Serjeant-Major G. H. Roberts writes: "Captain F. H. Noke, R.A.M.C., acquitted himself well in the recent Army and Navy Boxing Championship here, in the Officer's Light Heavies he defeated Lieutenant W. C. Wilson, 1st Leicestershire Regiment, the latter doing very well in the third round, but too late to get on terms. The fight was a very good-humoured one.

"In the semi-final he defeated Lieutenant C. Rumney Samson, R.N. (counted out). This was a hard-fought fight.

"In the final he met Lieutenant W. M. Nash, R.N., and was defeated after a fine fight. The loser was vociferously applauded for his pluck. Had the spectators known that he was suffering from a sprained ankle and knee, their sympathies would have been more pronounced. Captain Noke's defeat was keenly felt at the Connaught Hospital. We were a sad lot that night.

**"ROYAL ARMY MEDICAL CORPS BAND CONCERT.**

"The band of the Corps are to be congratulated upon the excellent concert they provided for the troops quartered in Longmoor Camp. The concert was given in the Church of England Soldiers' Institute there, the hall being filled with an appreciative

audience. The chair was taken by Colonel E. C. Ingouville-Williams, C.B., D.S.O., commanding the Mounted Infantry, who, at the conclusion, thanked Mr. G. P. Robertson, the bandmaster, and the band for their services, and congratulated them upon their excellent performance. In addition to the many fine instrumental items, Sergeant Dixon sang two good songs, Miss Mabel Applin was deservedly encored for the series of songs she so capably rendered, and humorous items were contributed by Corporal Cairns and Lance Corporal Stafford.

#### "CONCERT AT THE CONNAUGHT HOSPITAL.

"A series of winter concerts for patients in the Connaught Hospital was inaugurated on November 8, an excellent programme being presented.

"The band of the 1st Norfolk Regiment (by kind permission of Lieutenant-Colonel J. Marriott, M.V.O., D.S.O., and officers), under Mr. Geo. Deans, gave several items, including 'Popular Airs,' 'Mikado,' and 'Reminiscences of Wales.' Each selection was admirably given and was enthusiastically received. Corporal Croucher, 1st Norfolk Regiment, an excellent comedian and a great favourite with his comrades, convulsed his audience with 'Wait till the Work Comes Round,' 'The Cottage with the Roses round the Door,' 'Wait for Me,' and 'Oh, Dearly Beloved Brether-en.' Mr. Pat Cooney was splendid, his cycle of songs, 'Dawn,' 'What a Fool You would be to Believe Her,' 'Balleymore,' 'Mountains of Mourne,' were delightful, and the audience were loth to let him cease. Sergeant-Major Roberts, R.A.M.C., sang 'Good Company' in very pleasing style. Sergeant Dixon, R.A.M.C., contributed 'River of Years,' and 'The King's Own' in very fine voice, and Captain R. R. Lewis, R.A.M.C., tickled the audience immensely with some amusing 'Short-Stories.' We trust he has a few more for future occasion. Our old friend, Mr. H. G. Masters, recited the 'Dandy Fifth' in good style, and as an encore gave 'The Colonel's Wife,' an amusing story of a lady placing a hot poultice on the wrong man.

#### "FOOTBALL.

"The following games have recently been played by our Corps team —

Versus *Farnborough* in the Hants Senior Cup. Result, 2—0 in our favour.

"Played on opponents' ground. The team was as follows: Privates (Queleh (goal), Privates Dash and Ball (backs), Private Lee, Corporal Miller, and Private Phillips (half backs), Privates Prince, Hazell, Gillham, Yates, and Diamond (forwards).

"It would be invidious to select any player for special praise who all did so well. The refreshing vigour and energy displayed by the team on this occasion was delightful.

Versus *East Lancashire Regiment* on our ground. Result, 5—2 in our favour.

"We made a remarkable recovery, for at one time the East Lancashire were 2 goals the lead, but when a heavy storm broke the ground, the heavy going seemed to disorganize the East Lancashire, for before half-time our team scored 3 goals.

"The visitors were the first to be aggressive, and after some pretty touches along the line, Hartley opened the scoring almost immediately. A few minutes later Duckworth added a second goal during a scrimmage in the goal mouth. Two goals up in ten minutes put the medicals on their mettle, and during a general mêlée in the goal mouth one of the visitors' backs made a mistake, and a penalty was awarded, from which Ball scored. Then the rain came, and with it a change of fortunes. The Lancashires were evidently at sea with a greasy ball, and Hazell easily netted a second goal. Just before half time Gillham got through on his own and put us in the lead with a fine effort.

"On resuming, we still made the running, and Diamond, and then Prince, netted a goal each; both were extremely fine shots.

"Team: Privates Queleh, Ball and Dash; Yates, Miller and Lee, Diamond, Brisbane, Gillham, Hazell, and Prince.

"Versus *Royal Engineers*. Result, 2—0 against us.

"The less said about this game the better; it was certainly a poor exhibition of football on the part of both teams. Private McClusky, R.A.M.C., and a Royal Engineer player were ordered off: the former has been suspended. Therefore, 'exit' our right wing.

"Versus *1st Grenadier Guards*, in the Amateur Cup. Result, 1—0 in our favour.

"This tie was entered into by our supporters in a humble spirit, knowing that we lacked the services of such seasoned men as Price, Tipping, Darby, McKeer, Gregson, Diamond, and McClusky. But the young blood infused into the team rose to the occasion splendidly and worked like tigers. The score just represents our superiority. The goal was scored by Prince, a young gentleman who has a great future before him; he is fast, clever, and a good worker.

"Versus *4th Middlesex Regiment* in the Army Cup. Result 2—0 against us.

"This was a finely contested game, no goals being scored at the call of time. For three-quarters of the period we were in our opponents' half, when the result should have been made safe, but the shooting of the forwards was execrable, only Prince having any idea where the net was. Extra time was ordered, when our opponents scored after three minutes' play from a corner foolishly given by the left half. From this to the end our men were a beaten team. 'Oh, that elusive Cup!'

"Versus *Dorsetshire Regiment*. Result, 1—0 in our favour.

"This League encounter took place at Blackdown and calls for very little comment. The play was very mediocre. Quelch gave a fine display of goal-keeping on this occasion.

#### "HARWOOD CUP COMPETITION.

"Nos 1 and 6 Companies recently met at Aldershot in the above competition, the result, after a well-contested game, being in favour of the latter by the only goal scored, No. 6 Company now meet No. 2 Company in the second round at Aldershot.

#### "PRESENTATION TO QUARTERMASTER AND HON. LIEUTENANT E. W. NEWLAND BY THE MEMBERS OF THE SERJEANTS' MESS, ALDERSHOT.

"The members of the Serjeants' Mess were present in great force in their mess-room on the evening of the 8th inst., on the occasion of the concert held in honour of Lieutenant Newland, who has recently been gazetted to a Commission as a Quartermaster in the Corps. He had been for many years one of the most popular members of the mess, and this was shown in practical fashion by the hearty congratulations he received on his well-merited promotion from all present. The chair was taken by Serjeant-Major F. J. Bollen, who presided in genial fashion over what proved as happy a gathering as the mess had ever experienced. A number of the officers of the Corps attended, and thoroughly enjoyed the excellent concert, adding their congratulations to those of the members of the mess. The good tone of the mess was reflected in the programme which the concert committee had arranged, and with one or two exceptions rendered by members of the Corps. The songs were excellently rendered, the music was good, and the humour was clean. Altogether the evening was one of great enjoyment.

"The toast of the evening, that of the health of Lieutenant Newland, was proposed in hearty fashion by the Chairman, who said they had gathered to wish their old and good comrade the very best of luck on his promotion. Mr Newland had been an old member of that mess and a very good one; in fact, he was one of the best in Aldershot. He had always endeavoured to make all at home, and they were sorry to lose him. No doubt they would miss him from his old corner in that mess, and the pleasant evenings at cards, but he was going to take up a better 'job,' so they all wished him every success in his new sphere of duty, and hoped to see him back in Aldershot again. The toast was received with musical honours given with a will, and in reply Lieutenant Newland said that it was a peculiar experience for him to have the privilege to respond to a toast of his own health in that mess, where he had proposed so many toasts of that kind. He could not tell them all he felt at the very kind way they had received that toast, and the many kind things that had been said, nor in leaving so many good friends and comrades in Aldershot. He had been told that his troubles were just commencing. Well, he hoped to meet them and beat them, and trusted that the same good fortune that had come to him would also in the course of time fall to each member of that mess. No doubt he would greatly miss the quiet evenings with the card school, but he left a worthy representative in their Chairman to take his place. In thanking them for their kind expression of goodwill he wished the mess all prosperity and the members all good health and good luck.

"An interesting little ceremony took place a few days after the above incident when all members forgathered in the Serjeants' Mess to present Quartermaster and Honorary Lieutenant E. W. Newland with a souvenir as an expression of their appreciation of an old member. The gift was acknowledged in felicitous terms. After a few minutes' conversation the health of the recipient was drunk and the proceedings closed.

#### "ARRIVALS.

"Quartermaster and Hon. Lieutenant R. R. Cowan has arrived for duty at the Connaught Hospital. Staff Nurse Miss L. E. James, Q.A.I.M.N.S., has arrived for duty at the Connaught Hospital.

On the occasion of the twenty-first Universal Cookery and Food Exhibition held at the Royal Horticultural Hall, the Team from the Connaught Hospital obtained third place in the Hospital Cookery Competition, Privates Clendinning and Ellison being awarded silver and bronze medals respectively. Both these men have gained similar awards in previous years.

"The winning teams and marks were as follows :—

Alexandra Hospital, Cosham .. ..	324 points.
Military Hospital, Chatham .. ..	323 ..
Connaught Hospital, Aldershot .. ..	322 ..

"The position and points gained by the team from the Connaught Hospital reflects every credit on Sergeant W. Palmer, the superintending cook, for the care taken by him in teaching his men."

*Note.*—The Notes in last month's Journal from R.A.T.A., Aldershot Branch, were written by Private Day, R.A.M.C., and not by Staff-Sergeant Williams as stated.—Ed.

**NOTES FROM SIMLA.**—Lieutenant-Colonel R. S. F. Henderson, V.H.S., R.A.M.C., Secretary to the Principal Medical Officer, His Majesty's Forces in India, writes as follows :—

"*Appointments.*—Colonel S. C. B. Robinson appointed Principal Medical Officer 1st (Peshawar) Division, *vice* Colonel T. J. R. Lucas, transferred.

"Colonel T. J. R. Lucas appointed Principal Medical Officer, Jubbulpore and Jhansi Brigades, *vice* Colonel S. C. B. Robinson, transferred.

"Captain H. C. R. Hime, R.A.M.C., is appointed a Specialist in the Prevention of Disease, and appointed to the charge of Madras Brigade Laboratory.

"A list of officers appointed to the command of Station Hospitals, detailed for service at Aden and nominated for transfer to and from Burma is attached.

"*Leave.*—Captain A. H. Jacob, 3rd (Lahore) Division, granted eight months, general leave on urgent private affairs from September 28, 1910.

"*Postings.* The following changes are made in the list of postings of Royal Army Medical Corps Officers coming out for a fresh tour in India :

"1st (Peshawar) Division.—Captain A. C. Duffey from the 7th (Meerut) Division

"Lieutenant A. M. Pollard from the 9th (Secunderabad) Division.

"2nd (Rawalpindi) Division.—Captain J. W. West from the 3rd (Lahore) Division.

"Lieutenant W. G. Wright from the 9th (Secunderabad) Division.

"3rd (Lahore) Division.—Captain H. F. Shea from the 2nd (Rawalpindi) Division.

"5th (Mhow) Division.—Lieutenant-Colonel R. W. Wright from 8th (Lucknow) Division, *vice* Lieutenant-Colonel T. H. F. Clarkson not coming out.

"Major C. H. Hale, D.S.O., *vice* Major G. A. Moore, not coming out.

"7th (Meerut) Division.—Lieutenant C. H. O'Rorke from Burma Division, *vice* Captain E. L. Moss, tour expired, by exchange.

"Major W. G. Bevis.

"5th (Mhow) Division.—Captain J. E. H. Gatt, *vice* Captain R. L. Popham, not coming out.

"9th (Secunderabad) Division.—Captain J. G. Foster from 2nd (Rawalpindi) Division, *vice* Lieutenant W. G. Wright, posted to 2nd Division.

"Burma Division.—Major G. B. Carter, *vice* Major W. W. O. Beveridge, not coming out.

"*Reliefs.*—The following changes are made in the list of tour-expired officers detailed to embark for England :—

"Lieutenant-Colonel W. E. Berryman will not sail by the 4th Transport 'Rewa,' having proceeded on medical certificate leave and reverts to the Home Establishment.

"Captain K. A. C. Dong sailed by 1st Transport 'Rewa' instead of 3rd Transport 'Plassy.'

"Captain G. A. Kempthorne will sail by 2nd Transport 'Dongola' instead of 3rd Transport 'Plassy.'

"Captain E. G. R. Lathgow will sail by 3rd Transport 'Plassy' instead of 2nd Transport 'Dongola.'

"3rd Transport 'Plassy' stops at Aden instead of 2nd Transport 'Dongola,' and they will leave there on November 8, 1910.

"Captain W. F. Ellis will be in medical charge of 4th Transport 'Rewa' Lieutenant-Colonel Berryman, proceeded home on sick leave.

"Captain E. L. Moss will sail by 8th Transport 'Dongola' instead of Captain G. B. F. Churchhill, on exchange on the Indian roster of service."

#### "I. TO COMMAND STATION HOSPITALS.

"*Northern Army.* Lieutenant-Colonel M. O'D. Braddell, Rawalpindi, June, 1910; Lieutenant-Colonel B. M. Skinner, M.V.O., Peshawar, May, 1909; Major H. Pocock, Nowshera, April, 1910; Lieutenant-Colonel H. J. Fletcher, Sialkot, March, 1909; Major E. M. Hassard, Lahore Cantonment, June, 1910; Lieutenant-Colonel G. F. H. Marks, Ferozepore, February, 1910; Lieutenant-Colonel H. Carr, Jullundur, February, 1910; Lieutenant-Colonel A. E. Tate, Ambala, February, 1909; Lieuten-

Colonel E. H. Lynden-Bell, Meerut, November, 1909; Lieutenant-Colonel S. C. Philson, Bareilly, August, 1910; Lieutenant-Colonel H. N. Thompson, D.S.O., Lucknow, March, 1909; Lieutenant-Colonel J. M. F. Shine, Fyzabad, October, 1910; Lieutenant-Colonel J. S. Davidson, Allahabad, October, 1909; Lieutenant-Colonel W. B. Thomson, Calcutta, January, 1908; Lieutenant-Colonel H. H. Brown, Murree, January, 1910; Lieutenant-Colonel T. Daly, Dalhousie, March, 1910; Major H. N. Dunn, Dagshai, February, 1910; Captain P. C. T. Davy, Jutogh, July, 1910; Major M. P. C. Holt, D.S.O., Kasauli, February, 1911; Major A. W. Bewley, Landour, December, 1909; Lieutenant-Colonel G. H. Bailefoot, Rankhet, August, 1910; Lieutenant-Colonel S. Westcott, C.M.G., Chakrata, October, 1910; Lieutenant-Colonel J. S. Green, Naini Tal, October, 1910; Major R. J. Copeland, Darjeeling, March, 1910; Major H. G. Martin, Lebong, March, 1910.

"*Southern Army*.—Lieutenant-Colonel F. W. C. Jones, Quetta, on arrival from England; Lieutenant-Colonel L. T. M. Nash, Karachi, November, 1910; Lieutenant-Colonel G. E. Hale, D.S.O., Mhow, on arrival from England; Major C. W. R. Healey, Nasirabad, April, 1910; Lieutenant-Colonel R. J. Geddes, D.S.O., Jabulpore, February, 1909; Lieutenant-Colonel R. W. Wright, Jhansi, on arrival from England; Lieutenant-Colonel R. H. Penton, Poona, January, 1910; Lieutenant-Colonel A. T. I. Tilly, Belgaum, October, 1909; Lieutenant-Colonel G. G. Adams, Colaba, August, 1910; Lieutenant-Colonel D. Hennessy, Ahmednagar, March, 1909; Lieutenant-Colonel W. C. Beevor, C.M.G., Bangalore, January, 1910; Lieutenant-Colonel C. T. Blackwell, Madras, on arrival from England; Lieutenant-Colonel H. S. McGill, Secunderabad, January, 1910; Lieutenant-Colonel C. E. Nichol, D.S.O., Maymyo, January, 1910; Lieutenant-Colonel S. Powell, Rangoon, March, 1910; Major M. P. Corker, Mount Abu, October, 1909; Major J. D. G. McPherson, Pachmarhi, March, 1910; Major J. W. Bullen, Wellington, March, 1910.

#### "II. ADEN RELIEFS.

"(1) Lieutenant-Colonel R. L. R. Macleod, 4th (Quetta) Division, *vice* Colonel T. J. O'Donnell sailing by 3rd Transport 'Plassy,' November 3, 1910 from Bombay, to Command Station Hospital, Aden.

"(2) Major T. H. C. Goodwin, D.S.O., 4th (Quetta) Division, *vice* Lieutenant-Colonel L. W. Swabeu sailing by 8th Transport 'Dongola' February 22, 1911, from Bombay.

"(3) Captain G. W. W. Ware, 2nd (Rawalpindi) Division, *vice* Captain C. W. O'Brien, sailing by 3rd Transport 'Plassy,' November 3, 1910, from Bombay.

"(4) Captain R. W. Powell, 6th (Poona) Division, for charge of Brigade Laboratory, *vice* Captain P. J. Dwyer, D.P.H., sailing by 3rd Transport 'Plassy' November 3, 1910, from Bombay.

"(5) Captain A. D. O'Carroll, 3rd (Lahore) Division, *vice* Captain F. G. R. Lathgow, sailing by 8th Transport 'Dongola,' February 22, 1911, from Bombay.

#### "III.—TO BE TRANSFERRED FROM BURMA (1910-11)

• Lieutenant W. B. Purdon, 9th (Secunderabad) Division, Wellington.

#### "FOR DUTY IN BURMA (1910-11).

"Major G. B. Carter, England; Captain W. Egan, 3rd (Lahore).

#### • IV.—FOR DUTY IN CONNECTION WITH EMBARKATION AND DISEMBARKATION OF TROOPS AND INVALIDS DURING THE SEASON 1910-11

"Major W. P. Gwynn, Karachi; Captain H. M. Nicholls, Bombay."

### ARMY MEDICAL RESERVE.

The undermentioned Lieutenants to be Captains, dated November 1, 1910. John Murphy, Samuel K. Adams, M.B.; Murray R. Taylor, M.B.

### SPECIAL RESERVE OF OFFICERS.

#### 1. ROYAL ARMY MEDICAL CORPS.

The undermentioned Lieutenants to be Captains: William M. Browne, dated August 1, 1910, Charles V. Nicoll, dated November 1, 1910.

C The undermentioned Lieutenants have been confirmed in their rank. William Darling, M.B., John M. Darling, M.B., dated October 14; George H. Stevenson, M.B., in S. B. Hamilton, M.B., Leopold T. Poole, M.B., dated October 25; Duncan at-fadyen, M.B., Charles M. Page, M.B., F.R.C.S., William Leckie Webster, M.B., dated October 28, John H. Bell, M.B., dated November 8, to be Lieutenants (on probation); David Torquil Macleod Large, M.B., dated September 23, 1910; John Adams, *sin.*, dated September 19, 1910, Cadet-Sergeant Charles John Simpson, M.B., from

the Belfast University Contingent Officers' Training Corps, dated October 25, 1910; Aubrey Gardner Brown, dated September 10, 1910; David Turnbull Richardson, M.B., dated September 30, 1910; Frederick William Lumsden, dated October 13, 1910.

### TERRITORIAL FORCE.

#### YEOMANRY.

*East Riding of Yorkshire.*—Surgeon-Lieutenant Robert A. Draper to be Surgeon-Captain, dated September 14, 1906.

#### ROYAL FIELD ARTILLERY.

*1st West Riding Brigade.*—Surgeon-Captain John Nightingale, M.D., to be Surgeon-Major, dated August 13, 1910.

*2nd Wessex (Howitzer) Brigade.*—Surgeon-Lieutenant Harold F. Bassano, M.B., to be Surgeon-Captain, dated April 18, 1906.

#### ROYAL ARMY MEDICAL CORPS.

*5th Southern General Hospital.*—Leonard Nicholson Blake to be Quartermaster with the honorary rank of Lieutenant, dated August 23, 1910.

Surgeon-Major William Owen Evans, from the 2nd Volunteer Battalion, the Royal Welsh Fusiliers, to be Major, with precedence as in the Volunteer Force, dated April 1, 1908.

*Welsh Border Mounted Brigade Field Ambulance.*—Lieutenant Douglas C. L. Orth to be Captain, dated September 16, 1910.

*4th Southern General Hospital.*—The appointment of Lieutenant-Colonel Charles E. Russel Rendle, F.R.C.S. (Edin.) and of Major Henry W. Webber, F.R.C.S. (Edin.) which was announced in the *London Gazette* of November 20, 1908, is antedated September 29, 1908.

*1st East Anglian Field Ambulance, Royal Army Medical Corps.*—Lieutenant Octavius Roberts Ennion, from the list of Officers attached to units other than medical units, to be Lieutenant, dated October 3, 1910.

*2nd Lowland Field Ambulance Royal Army Medical Corps.*—Lieutenant Dr. Shannon, M.B., to be Captain, dated September 15, 1910.

*2nd South Western Mounted Brigade Field Ambulance Royal Army Medical Corps.*—John Robinson Benson, F.R.C.S. (Eng.), late Lieutenant, Army Medical Reserve, to be Lieutenant, dated September 16, 1910.

*3rd Home Counties Field Ambulance Royal Army Medical Corps.*—Quartermaster and Honorary Captain (Quartermaster and Honorary Captain, retired pay) Martin H. is granted the honorary rank of Major, dated April 17, 1910.

*2nd London (City of London) Field Ambulance Royal Army Medical Corps.*—Transport Officer and Honorary Lieutenant Ernest J. Thurgar to be removed to the Territorial Force, dated November 12.

#### Officers attached to Units other than Medical Units.

William Murray, M.D., to be Lieutenant, dated September 15, 1910.

Leonard Colebrook, M.B., to be Lieutenant, dated October 3, 1910.

Lieutenant Alexander T. Mulhall to be Captain, dated June 15, 1910.

Frederic George Harper, M.B., to be Lieutenant, dated August 12, 1910.

Lieutenant John Aitken, M.D., to be Captain, dated September 15, 1910.

Lieutenant Arthur L. B. Green resigns his commission, dated October 26, 1910.

Captain William Moreland Hakaday Spiller, M.B., Royal Army Medical Corps, to be an Adjutant of a School of Instruction, dated October 12, 1910.

Major Richard J. M. Coffin resigns his commission, dated October 29, 1910.

Lieutenant-Colonel and Honorary Surgeon-Colonel James B. Ronaldson resigns his commission, and is granted permission to retain his rank and to wear the uniform, dated November 9, 1910.

Jacob Frederick Farrow to be Lieutenant, dated September 6, 1910.

#### Unattached list for the Territorial Force.

The transfer from the 2nd Volunteer Battalion, The Royal Welsh Fusiliers, of Surgeon-Captain William Owen Evans, which was announced in the *London Gazette* of January 29, 1909, is cancelled.

Major William Owen Evans, from the Territorial Royal Army Medical Corps, to be Major, dated April 1, 1908.

### QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following ladies have received appointments as Staff Nurse; Miss M. L. E. James.

*Postings and Transfers.*—Matrons: Miss A. S. Bond, to Alexandria, on Egypt; Miss S. F. Oram, to Netley, from Malta. Sisters: Miss M. S. Ran Africa, from Woolwich; Miss K. Coxon, to South Africa, from Cosham; Miss G.

to South Africa, from Cosham; Miss G. M. Allen, to South Africa, from Cambridge Hospital, Aldershot; Miss M. E. M. Grierson, to Cairo, on arrival in Egypt; Miss E. M. Lyde, to Cairo, on arrival in Egypt; Miss H. Hartigan, to Khartoum, from Cairo; Miss L. E. Mackay, to Alexandria, from Cairo. Staff Nurses: Miss C. M. Pearce, to Cosham, from Cambridge Hospital, Aldershot; Miss L. E. James, to Connaught Hospital, Aldershot, on appointment; Miss I. J. Taunton, to London, on appointment; Miss R. C. S. Carleton, to Cambridge Hospital, Aldershot, on appointment; Miss E. J. Barrow, to Chatham, from London; Miss S. F. Davies, to Shorncliffe, from Chatham; Miss M. E. Medforth, to Cairo, on arrival in Egypt; Miss C. G. Lees, to Cairo, from Khartoum; Miss F. M. Tosh, to Khartoum, from Alexandria; Miss M. Tedman, to Malta, from Curragh; Miss L. A. Ephgrave, to Malta, from Cork; Miss J. H. Congleton, to Malta, from Tidworth; Miss M. C. Corbishley, to Tidworth, from Netley; Miss I. McM. Beaton, to London, S.W., instead of to Royal Victoria Hospital, Netley, as already notified.

(C) *Appointments Confirmed.*—Staff Nurses: Miss M. T. Casswell, Miss M. L. Cutfield, Miss E. J. French, Miss E. S. Killery, Miss E. Lowe, Miss McCormick, Miss M. McNaughtan; Miss J. D. C. McPherson, Miss E. L. Murray, Miss J. Todd, Miss F. L. Trotter, Miss D. Turner.

## ROYAL ARMY MEDICAL COLLEGE.

EXAMINATION OF LIEUTENANTS, ROYAL ARMY MEDICAL CORPS AND INDIAN MEDICAL SERVICE, AT THE CLOSE OF THE SECOND SESSION, 1910.

*Hygiene.*—Written Examination.

(1) What is the primary effect of marching on the constitution? To what extent is it physiological and beneficial, and under what circumstances can it become pathological? What resources are there, at the disposal of the Commanding Officer, for preventing and obviating this latter effect?

(2) Define a "Food." Discuss in detail the metabolism of protein in the body. To what do you understand by the expression "protein saving power," and what substances possess this power?

(3) In what manner does the micro-organism of enteric fever (a) leave the body of an infected man, and (b) enter the body of the healthy man? State clearly what men include under the term "infected," and which of these do you consider the most dangerous?

(4) How would you set about tracing the drainage system of a barrack, apart from the use of plans? Enumerate and describe in detail the various appliances and fixtures which would assist you in this.

(5) A soldier has been admitted to hospital from a certain camp suffering from a ailure similar to cholera. The water supply of the camp is obtained from a well, and water is supposed to be boiled. After boiling it is distributed to the tents and in canvas water-bottles for the sake of coolness. Detail the procedure you would follow with reference to (a) the confirmation of the diagnosis; (b) the discovery of the cause of the disease. The man has not been out of camp for some time.

*Hygiene.*—Practical Examination.

Complete the following analysis and give your opinion on the potability or fitness of the water sample, with your reasons for such an opinion:—

Total solids	..	..	..	..	..	36	parts per 100,000
Volatile solids	..	..	..	..	..	26	" "
Chlorine	..	..	..	..	..	"	" "
Free ammonia	..	..	..	..	..	"	" "
Albuminoid ammonia	..	..	..	..	..	0.015	" "
Nitrites	..	..	..	..	..	"	" "
Nitrates	..	..	..	..	..	"	" "
Hardness (total)	..	..	..	..	..	7	" "
Hardness (removable)	..	..	..	..	..	3	" "
Oxygen absorbed in four hours	..	..	..	..	..	0.1	" "

*Microbiological Examination.*—Organisms, producing acid and gas in lactose broth, in every 10 cc.

*Microscopical Examination.*—Leaves and vegetable debris only.

State solution before you is supposed to be an alkali.

Calculate the dilution necessary to correct it.

*Hæmatology.*—Written Examination.

What are the changes usually encountered in the blood in an advanced case of leucæmia? Describe Leucocythæmia?

(2) In searching the buccal secretion for the *Diplococcus intracellularis meningitidis*, what other micro-organisms may be found which would render your diagnosis difficult, and how would you distinguish between them?

(3) Enumerate and discuss the fallacies which have to be guarded against carrying out the agglutination test in a case of enteric fever,

(4) Describe the parasites of kala-azar and Oriental sore. How many species recognised and what is known as to the probable mode of infection in each instance?

(5) Give a concise account of the sexual cycle of development of malarial parasite.  
N.B.—Four questions only need be answered.

#### *Pathology. Practical Examination.*

(1) Examine the broth culture marked with your number, and describe in your paper what you have found. Leave two stained films, one of them a "Gram" specimen, for examination.

(2) Stain the blood film from a case of malaria and leave one of the parasite focus under your oil-immersion lens. Describe briefly the forms which you have encountered and the variety of malaria present.

(3) Mount and stain the paraffin section so as to demonstrate the presence of "acid-fast" organisms.

(4) Oral examination.

#### *Military Surgery.*

(1) Mention the circumstances which chiefly affect (1) the wounding power, (2) the power of overcoming a resistance, of a bullet.

(2) Give the diagnosis, prognosis and treatment of a total transverse lesion of nerve in an aseptic gunshot wound. How would you distinguish this lesion when inflicted from local shock?

(3) Under what circumstances is laparotomy advisable in penetrating gunshot wound of the abdomen? Discuss the diagnosis and prognosis of such a case.

(4) Describe an "explosive" gunshot wound of both bones of the leg. Instantaneously your treatment (1) in the field, (2) on the lines of communications, (3) at the hospital.

#### *Tropical Medicine*

(1) Describe the symptoms, differential diagnosis and treatment of ankylostomiasis.

(2) Mention three possible causes of chronic enlargement of the spleen in the Tropics, and describe the methods by which you would arrive at an exact diagnosis in any particular case.

(3) Discuss the differential diagnosis between malignant tertian malaria and the West two other febrile conditions, of non-malarial origin, with which it might be confused. Pathological details are not required.

(4) Give the treatment of a case of acute amoebic dysentery. What special precautions are to be anticipated in this disease?

#### *Military Medical Administration.*

(1) State very briefly the chief functions of the Army Medical Service.

(2) What are the duties of a medical officer in charge of troops as regards the occurrence of a case of infectious disease in barracks?

(3) Describe the procedure employed on the admission of a soldier to hospital.

(4) Enumerate the principal methods of transporting sick and wounded on land.

(5) Describe the medical service of a regiment in the field, and state the medical institutions that a wounded man would pass through before he reaches the base.

## PRIZE DISTRIBUTION.

Mr. Haldane distributed the prizes at the close of the half-yearly course of instruction for lieutenants on probation of the Royal Army Medical Corps and Indian Medical Service on Friday, October 23. After the report for the session had been read, the Commandant Mr. Haldane handed the various prizes to the successful candidates and delivered an address.

Mr. Haldane said that not even in the ambition of what their fortunate neighbours, the Admiralty, possessed was there anything which he knew, excelled the admirable building and equipment of that institution Alma, siege owed much to his predecessor, Lord Middleton, who, as Mr. Brodrie, three wholeheartedly into the work of raising the Army Medical Service to a high level. Remarkable progress had been made in the reduction of disease in the Army Department, particularly in India. The process has been of great advantage to the British Army. The medical Department has a half-pay list

India, at home, and in the overseas stations. Fewer men now fell out sick in the to 14d, and more men returned to the fighting line. There was a time when the Army Hosedical Service was not particularly distinguished. It did not contribute to science, M. any rate, in any large degree, nor was it famous all over the world as a model of Missat an Army Medical Service ought to be. But all that was changed, and its Cosldern organisation gave scope for every kind of talent. Names like those of Sir Hosilliam Leishman, Sir David Bruce, and Sir Almroth Wright would always be Missociated with the bacteriological work of the Army Medical Department. But Barriedes that field of bacteriology there was the whole field of physiology. There were Miss great questions of food and capacity of movement on which to a great extent turned Khat efficiency of the British Army, its endurance, its capacity for long marches, and Malt health of its soldiers. The method of physical training to-day was *toto coelo* Congerent from the physical training of a few years ago, and they were eliminating the Nettic called "soldier's heart." Within the last twelve months also the War Office were Nettic to arrange two experimental marches on Salisbury Plain, which taught them (At the ration of the British soldier, even under emergency conditions, ought to be, Miss is to sustain him in the same condition in which he began his march. That McNeriment cast a great deal of light upon the problem which the General Staff had Protto consider, how to maintain the vigour of an army in the field. The soldier's clothes l. required the consideration of the physiological specialist. It seemed pedantic to l of these things as applied to the individual, but when they were dealing with C 300 men very slight variations produced enormous results. Therefore he com-B xamined to them not merely the bacteriological side, but also the not less important Sc iological side of their studies. What they needed was exact knowledge; and, if Ja Hy were obtained, the money spent on equipping and maintaining the college would Cc (1) ived over and over again in wastage. They had made themselves and were 19. s phrased as being one of the most important parts of the British Army, and he icalved still greater progress lay before them

venbe prize list was as follows:—Lieutenant W. W. Treves, R.A.M.C., first Montefiore T. (2), first in Military Surgery; Parkes Memorial Prize, first in Hygiene, Marshall to aut Prize, Military Medical Administration, Herbert Prize for the highest aggregate, starenaut H. E. Shortt, I.M.S., second Montefiore Prize, second in Military Surgery, Col(3) enant R. C. Clifford, I.M.S., Fayer Memorial Prize, Pathology. Lieutenant Borinfe H. Harold, R.A.M.C., Tulloch Memorial Prize, Pathology; Ronald Martin Prize, mecal Medicine. Lieutenant R. F. Bridges, R.A.M.C., De Chaumont Prize, second O'Bxerogenic.

(4) The conclusion of the prize distribution Colonel D. Wardrop and the officers of vice useyal Army Medical Corps were "at home" in the mess. There were about eighty 1910tur, and among those present were Surgeon-General W. L. Gubbins (Director-

(6) Ad Army Medical Service), Mrs. and Miss Gubbins, Surgeon-General Sir Alfred sailrse s Surgeon-General Brantfoot, Surgeon-General and Mrs. Babbie, Surgeon-General sterries and Lady Cuffe, Sir James Porter (Director-General Naval Medical Service), lip-General and Miss Dorman, Surgeon-General and Mrs. Evatt, Surgeon-General wlt.

## of UNITED SERVICES MEDICAL SOCIETY.

"The next meeting of the above named Society will be held at the Royal Army .. Cq College, Grosvenor Road, S.W., on Wednesday, December 14, 1910, at 5 p.m., "iscapers will be read by Lieutenant-Colonel M. W. Russell, R.A.M.C., on "onal Collecting Stations for Wounded," and by Major W. E. Miles, R.A.M.C.(T.), "itis Ann."

## THE HONORARY OFFICERS AND SERJEANTS', PAST AND PRESENT, ANNUAL DINNER CLUB.

The Honorary Secretary would be greatly obliged if members of the above Club, e not already forwarded their annual subscriptions, will remit same to his 1 (12, Cotford Road, Thornton Heath, Surrey) at their convenience. The The O makes this appeal in order that the work on the actual night of the dinner August r. dismissed C The ex the notice in the Corps News of May last the following new members have dirlng,sc

n S,ge W. G. L. Fitchett and Geo. Westfield, at; fady al rmaster-Serjeant A Holden thid Ocl(serjeants H. J. Easey and P. le Poidevin, bel(n); hi sir, died

Serjeants G. P. Pursey, A. J. Daintree, A. J. Sanderson, M. Harlen, W. Ross, W. P. Oldridge, A. J. Anderton, C. Vickers, C. H. Hart, J. E. Partridge, D. MacDonald, J. H. R. Boulton, C. M. Pickup, J. Moore, R. Wilson, C. R. James, M. Stroud, D. Russell, S. Shaw, and A. V. Heggio.

## BIRTHS.

\* DUNBAR.—On November 8, at 18, Lynette Avenue, Clapham Common, London, S.W., to Captain and Mrs. B. H. Vella Dunbar—a daughter.

ELLCOME.—On October 22, at Kamptee, Central Provinces, the wife of Lieutenant J. E. Ellcome, of a daughter.

HAYES.—At Lympstone, Brandon Road, Southsea, on November 15, 1910, the wife of Major E. C. Hayes, R.A.M.C., of a son.

## MARRIAGES.

HARDING—RANDALL.—On September 28, at St. Paul's Church, Worthing, by the Rev. E. J. Cunningham, Captain Howard Harding, R.A.M.C., younger son of the late J. H. Harding, of Redonda, West Indies, to Kate Mary Elizabeth (Queenie), daughter of the late Charles Silvester Randall, of Tokenhouse Yard, London, and Mrs. Silvester Randall, of Alaska, Worthing.

HARRISON O'DWYER.—On November 8, at Christ Church, Clifton, by the Rev. Canon Haigh, vicar of St. Paul's, Clifton, assisted by the Rev. C. G. C. Lillingston, John Stubbs Harrison, Solicitor, Bristol, to Frances Joyce Gabrielle, only daughter of Surgeon-General T. F. O'Dwyer, late Army Medical Staff.

## DEATHS.

ANDERSON.—At Bury St. Edmunds, on October 24, 1910, Surgeon-Lieutenant-Colonel Robert Anderson, F.R.C.S.Edin., retired, late Medical Staff, aged 68. He entered the Service as Assistant-Surgeon (Staff) on March 31, 1868; became Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major, March 31, 1880; Surgeon-Lieutenant-Colonel, Medical Staff, on March 31, 1888, and retired on April 26, 1893. His war service was: Egyptian Expedition, 1882. Medal, bronze star. Since his retirement he was an Alderman of Bury Town Council, and served as Mayor in 1907. He was a Justice of the Peace for West Suffolk, and formerly a member of the West Suffolk County Council. He had been for several years Chairman of the Central Committee of the Bury St. Edmunds Constitutional Club.

BEATTY.—At London, on October 27, 1910, Honorary Brigade-Surgeon James McNeill Beatty, half-pay, late Army Medical Department, aged 81. He entered the Service as Staff Assistant-Surgeon on December 12, 1854; served in the 91st and 98th Foot and Army Medical Department; became Surgeon, August 21, 1867; Surgeon-Major, March 1, 1873, and retired on half-pay with the honorary rank of Brigade-Surgeon on January 24, 1880.

HYDE.—At Upper Norwood, on October 18, 1910, Honorary Deputy-Surgeon-General John Martin Hyde, retired, late Army Medical Department, aged 80. He entered the Service as Assistant-Surgeon on November 3, 1854, served in the 14th and 84th Foot; became Surgeon (Staff) on June 8, 1867; Surgeon-Major, Army Medical Department, March 1, 1873; and retired on half-pay, with the honorary rank of Deputy-Surgeon-General November 21, 1879. War service. He served with the 14th Regiment in the Crimea from January 19 to September 2, 1855, including the Siege of Sebastopol and Assault of June 18. Medal with clasp and Turkish medal.

IRWIN.—At Nottingham, on October 23, 1910, Deputy-Surgeon-General Chamney Graves Irwin, M.B., retired, late Army Medical Department, aged 79. He entered the Service on February 24, 1854, as Assistant-Surgeon 28th Foot, became Surgeon (Staff) December 1st, 1863; served with the 13th, 15th, and 86th Foot; promoted Surgeon-Major Army Medical Department, March 1, 1873; Brigade-Surgeon November 11, 1880; Deputy-Surgeon-General December 10, 1884; and retired on retired pay on January 4, 1891. His war service was: Crimean Campaign, 1854-5, Alma, siege and fall of Sebastopol. Medal with two clasps; Turkish medal.

MALCOLM.—At Torcross, Stokenham, Devon, on October 14, 1910, Surgeon-Major John Vicary Malcolm, M.D., retired, late Army Medical Department, aged 79. He entered the Service as Assistant-Surgeon (Staff) on March 31, 1864; served also in 7th Hussars and 9th Lancers; became Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major March 28, 1877; was placed on the half-pay list July 6, 1880, and retired July 6, 1881.

WELCH.—At Southborough, Kent, on October 25, 1910, Surgeon-Colonel Francis Henry Welch, retired late Army Medical Staff, aged 71. He entered the Army as Staff-Assistant-Surgeon; served in the 22nd Foot; became Surgeon, Army Medical Department March 1, 1873; Surgeon-Major March 19, 1876; Brigade-Surgeon February 24, 1887; Surgeon-Colonel April 5, 1892, and retired on retired pay May 1, 1895. His war service was: Hazara Expedition, 1888; mentioned in despatches. He gained the Alexander Memorial Gold Medal in 1873, and again in 1882.

## EXCHANGES, &c.

*The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Gheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.*

A free issue of twenty-five excerpts will be made to contributors of all articles classified under the heading of Original Communications, Lectures, Travels, and Proceedings of the United Services Medical Society.

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## Notices.

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*Foreign:* Norsk Tidsskrift for Militaermedicin, Giornale di Medicina Militare, Annales d'Hygiène et de Médecine Coloniales, Archiv. für Schiffs- und Tropen-Hygiene, Deutsche Militärsärztliche Zeitschrift, Russian Medical Journal, Annali di Medicina Navale e Coloniale, Office International d'Hygiène Publique, Le Caducée, Japanese Medical Journal, Deutsche Militärärztliche Zeitschrift, Boletín de Sanidad Militar.





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2037	2037	2037